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Variations in Crop Production Costs in Medina County, Ohio

F. L. Morison

OHIO
AGRICULTURAL EXPERIMENT STATION
Wooster, Ohio

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VARIATIONS IN CROP PRODUCTION COSTS IN MEDINA COUNTY, OHIO

F. L MORISON

This bulletin presents an analysis of the crop production costs of 23 farms located in the east-central part of Medina County, Ohio. The section is somewhat typical of a large area of northeastern Ohio. The cost records were collected by the route method during the five years, 1920-1924. All farms were visited at regular intervals of at least once a week and the farmers were assisted in keeping a complete record of their business.

An effort was made to select representative farmers, men who had attained different degrees of success in their occupation. The data presented herein show that there was a wide variation in the effectiveness with which the individual farmers carried on their production methods and point out some of the opportunities for lowering the costs of crop production.

Low cost per unit of product is desirable, not as an end in itself, but as a means to an end, that being maximum returns from the farm as a whole. The farmer who makes the largest income is not necessarily the one who raises all of his products at the lowest cost per unit. Volume of business and quality of the things produced are important factors in determining profits and should not be forgotten in the effort to reduce costs.

TYPE OF FARMING

Crops.—The average area of the farms studied was 135 acres, of which 80 acres were in crops and 37 acres in permanent pasture. Table 1 shows that during the 5 years of the study 12.1 per cent of the area of these farms was in corn, 9.5 per cent in oats, 12.1 per cent in wheat, 12.4 per cent in mixed clover and timothy hay, and 8.7 per cent in timothy. The rotation most commonly followed was a 5-year rotation of corn, oats, wheat, mixed hay, and timothy, altho a number of the farmers followed a shorter rotation of corn, oats, wheat, and clover on some of their fields.

A little more than half of the corn was put into the silo or fed green. There were silos on all but 3 of the 23 farms, dairying being the principal source of income. Corn was raised almost entirely for feed, the sales of this grain as well as of oats being negligible. Only about one-eighth of the corn land was seeded in wheat; approximately three-fourths was plowed the next spring for oats; and the remainder was planted to soybeans, barley, potatoes, and second-crop corn. The oat-stubble ground, with very few exceptions, was plowed for wheat, in which a grass seed mixture of either medium or mammoth red clover, alsike, and timothy was seeded early the following spring. Alfalfa was grown on only two of the farms. In some cases good crops of clover hay were secured the first year following wheat; in others the clover failed and the hay was largely timothy. About two-thirds of the meadows were allowed to stand the second year and on a considerable number of fields timothy hay was cut two or three years in succession. The five-year rotation was more common on farms which did not raise good crops of clover.

TABLE 1.—Utilization of Land Area, Average of 23 Farms, 1920-1924

Item	Acres	Per cent of total area
Corn, for grain	7.6	5.6
Corn, for silage and soilage	8.7	6.5
Oats	12.8	9.5
Wheat	16.3	12.1
Mixed clover and timothy hay	16.7	12.4
Timothy hay	11.7	8.7
Alfalfa	.3	.2
Soybeans	.8	.6
Potatoes	2.4	1.8
Other crops	2.2	1.6
Rotation pasture	.5	.4
Total rotated area	80.0	59.4
Permanent pasture	37.4	27.8
Woods	9.0	6.7
Orchard	3.8	2.8
Yard, lanes, waste, etc.	4.4	3.3
Total farm area	134.6	100

This rotation has been adopted no doubt to guard against a possible hay shortage, altho the chief difficulty with the rotation is that it does not yield enough legume hay for efficient dairying. Until recently if there was any surplus of timothy hay it could be sold to good advantage in the city markets. In fact, wheat and hay were of about equal importance as cash crops. Another factor tending toward retaining timothy in the rotation is that on a farm of a given area the five-year rotation requires less labor than the more intensive four-year rotation. Thus, in the case of a farm with 80 crop acres, eliminating the 16 acres of timothy from the rotation would mean 4 additional acres each of corn, oats, wheat, and clover a year. In the spring there would be an increase of 8 acres of plowing to be done, since plowing for oats is the common practice, and the additional work of preparing the seed bed, sowing 4 acres of oats, and planting 4 acres of corn. Next there would be an increase in the amount of corn to be cultivated, small grains to be harvested and threshed, and clover hay to be made, all more or less competing operations and altogether requiring approximately the same amount of labor as the making of 16 acres of timothy hay. Then in the fall there would be the additional work of plowing, fitting, and drilling the extra wheat and harvesting 4 more acres of corn. The intensive crops used to replace the timothy would require a yearly total of just three times as much labor as the timothy.

TABLE 2.—Crop Yields: Average on All Farms, by Years and for the Five-Year Period, 1920-1924

Crop	Average yield per acre					
	1920	1921	1922	1923	1924	1920—1924
Corn .... bushels..	34.4	43.5	39.4	44.6	20.9	40.3
Silage .... tons..	6.2	8.0	6.6	6.9	2.4	5.9
Oats .... bushels..	43.6	33.1	34.3	45.6	34.1	38.8
Wheat .... bushels..	16.5	15.8	16.2	20.1	20.8	17.9
Clover and mixed hay .... tons..	2.1	1.9	1.8	1.4	2.0	1.8
Timothy hay .... tons..	1.7	1.5	1.6	1.1	1.6	1.4

Table 2 shows the yield per acre of the principal crops. Both field and silage corn were very poor in 1924 due to the unusually backward and wet spring, but a good crop of hay helped to overcome the shortage of silage that year. For the 5 years, corn averaged 40.3 bushels, silage 5.9 tons, oats 38.8 bushels, wheat 17.9 bushels, mixed clover and timothy hay 1.8 tons, and timothy 1.4 tons per acre.

Fertility practices.—About 36 per cent of the total rotated area of these 23 farms was either clover or timothy meadow. The sod land plowed under annually amounted to 19 per cent of the total area in crops. Of this sod 63 per cent was first-year clover sod.

There was considerable variation in the intensity with which the farms were stocked and consequently in the amount of manure produced per crop acre. Crop acres per animal unit varied from 2.1 acres on the most heavily stocked farm to 9.6 acres per animal unit on the farm stocked most lightly. The average was 3.5 acres, there being an average of 23 animal units per farm. The amount of manure hauled per year ranged from 1.1 to 4.1 loads or tons per crop acre. The average was 2.2 loads, enough to cover each crop acre once every five years at the rate of 11 tons per acre. Of the total amount of manure applied to crop land exactly one-half was spread on the land to be plowed for corn. About 27 per cent was spread on the meadows, either in the fall or spring, and the remainder was applied to other crops, principally potatoes, and as a top-dressing on wheat. A total of 60 per cent of the manure was hauled in the following five months, arranged in order of number of loads hauled: February, January, August, May, and December. A total of 207 loads of manure was hauled per farm, per year, with an average expenditure of 1.05 man hours and 1.76 horse hours per load.

In addition to the barnyard and stable manure considerable quantities of commercial fertilizer were used. This consisted principally of 16 and 20 per cent superphosphate, and 2-8-2 and 2-12-2 mixed goods. Average applications of commercial fertilizer per acre of the different crops were as follows: corn 194 pounds, oats 143 pounds, wheat 252 pounds. Only a few of the farmers applied any lime during the period of the study.

Soils.—The topography of the area is level to gently rolling. On the basis of soil types, most of the farms fall into one of three groups, as follows: South and southwest of Medina, the county seat, the soils are largely Rittman and Medina silt loam. These soils have a heavy upper subsoil, so that under-drainage is only fair to poor. Surface drainage on these soils is fair to good. In the rolling belt of country west of Medina, Rittman and Medina silty clay loams predominate, these being slightly heavier in texture and a gradation toward the next group of soils found north of Medina, namely the Ellsworth and Mahoning silty clay loams. These latter soils have heavy to very heavy impervious clay subsoils with an under-drainage that is poor to very poor. The above named soils all need close tiling, heavy applications of fertilizer and lime, and organic matter. The drainage and fertilizer needs have been met to a fair degree on most of the farms.

Livestock.—Table 3 shows the average amounts of each kind of livestock on the farms studied and also the range in amounts among the different farms.[1]

Dairy cattle were the important class of livestock on most of the farms. One-half of the total farm receipts were from this enterprise, its importance being due to the large amount of permanent pasture and the excellent market for wholesale milk. Poultry

[1]Dairy and other livestock production costs are presented in Ohio Agr. Exp. Sta. Bulletin 424.

ranked second as a source of income. Hogs and sheep were of minor importance, hogs being kept in small numbers on 17 of the farms, and sheep on only 6 of them.

TABLE 3.—Livestock on Farms Studied

Item	Amount of stock per farm		
	Average 23 farms	Maximum	Minimum
Milk cows, number of head	11.0	20.0	2.0
Other cattle, animal units*	3.3	7.5	.0
Poultry, number of head	188.0	1,312.0	28.0
Sheep, number of ewes	11.0	99.0	.0
Hogs, hundredweight produced	10.3	53.5	.0
Horses, number of head	4.0	6.0	2.0

*"Animal unit" is used as a measure of the amount of livestock in terms of one horse, one cow, or a feed-consuming equivalent. One bull, two heifers, or three calves are considered as an animal unit.

Sources of income.—Dairy cattle, poultry, wheat, and hay were the principal sources of income on most of the farms. Dairy products sold amounted to $1,996 per farm or 45.3 per cent of the total gross receipts. Cash sales of cows, veal calves, and other cattle, less the cost of cattle purchased, amounted to $212 per farm or 4.8 per cent of the gross receipts. Poultry furnished 10.5 per cent of the receipts, sales of wheat 6.3 per cent, and hay 5.7 per cent. A surplus of hay was made on most of the farms; one-third of the total amount produced during the 5-year period was sold. Sixty-six per cent of the total receipts were from livestock, 26 per cent from sales of crops and fruit, and 8 per cent from miscellaneous sources.

The 5-year average farm prices of the various crops were as follows: corn $1.00 per bushel; oats 58 cents per bushel; wheat $1.41 per bushel; hay $16.17 per ton.

Labor and power used.—Seven of the farms were one-man farms employing from less than a month to six months of labor in addition to the operator. Eleven were two-man farms employing, in addition to the operator, a year-round man and up to two months of day labor. Seven farms were three- or four-man farms; the two having the largest number were farms specializing in fruit. The average number of men on all farms was 2; thus there were 40-crop acres per man.

Horses furnished most of the power for field work, tractors being used in varying degrees on 10 different farms during the five years. The first year of the study only 1 of the 15 farms had a tractor; while in the fifth year there were 8 tractors on 15 farms.

These tractors were used largely for plowing, disking, and pulling two tillage implements tandem, such as a spring-tooth harrow and cultipacker, or disk and spike-tooth harrow. The number of work horses on the different farms ranged from 2 to 6, the average being 4. Of all man labor operating horse-drawn equipment more than two-thirds was spent in driving two-horse teams and less than one-third in driving larger teams. Of the various operations in which horses furnished the power, more than one-half of the plowing, one-half of the spike-tooth harrowing and cultipacking, one-fourth of the spring-tooth harrowing, practically all of the rolling, drilling grain, drilling fertilizer, all of the corn planting, most of the cultivating, all of the hay cutting, and about one-half of the corn cutting were done with two-horse teams. Disking and cutting of grain were largely three-horse-team operations. The natural conservatism of farmers and the small size of fields were perhaps the principal reasons for the extensive use of two-horse teams. The average size of all crop fields on these farms was 8.3 acres.

Trucks were used for hauling on 12 of the farms, 8 of which were farms having tractors. During the first year of the study only 3 of the 15 farms had trucks; while in the fifth year there were 8 trucks on 15 farms.

VARIATIONS IN COSTS OF CROP PRODUCTION

It has been stated by some writers that the most important factors causing farm-to-farm variations in cost are not subject to control by individual farmers. While it is granted that the farm operator does not have the same control over his production program and the factors that affect costs as does the manufacturer, much of the data presented herein will show that there are a number of important factors that are under the control of the farmer. It is not to be denied that the weather, particularly rainfall and hail, may vary considerably in different parts of a county in the same year, and consequently be an important factor causing farm-to-farm variations in yield that year. But when four or five years are combined, as in this study, the weather as a factor causing differences in yield between farms loses much of its importance.

CORN FOR GRAIN

COSTS OF GROWING UP TO HARVEST

Reasons for variations in per-bushel costs.—The cost of raising corn up to, but not including, harvest ranged on the different farms from 54 cents to $1.16 per bushel. Obviously this wide range in cost per bushel is due to differences in total cost per acre and in yield per acre. Anything that cuts down the cost per acre without decreasing the yield reduces the cost per bushel. Similarly, the cost per bushel is reduced by any factor that increases the yield without a corresponding increase in cost per acre. It seems logical, therefore, to discuss first some of the factors accounting for variations in per-acre cost of growing corn.

Variations in labor and power costs.—As an average for all farms, man labor and horse and tractor work constituted 38.6 per cent of the total cost of growing corn up to harvest time. Cost of labor and power averaged $12.40 per acre and ranged from $9.85 to $16.60 per acre. Some of the factors that are responsible for this range in costs and that are under control of the farmer are: variations in size of machines and size of teams; source of power, i. e. horse or tractor; size and shape of fields; differences in what individual farmers regard as a good day's work; variations in man-labor and horse-work rates.

In plowing, which required about 30 per cent of the man labor on corn up to harvest, there was considerable variation in the time spent per acre, the range being from 1.2 to 3.1 hours where the plowing was done with a tractor and from 4.0 to 8.7 hours per acre when done by horses, a fact which indicates that there was considerable room for improvement on some of the farms. Table 36 shows the effect of adding an extra horse or changing the size of the implement in the tillage operations such as harrowing, disking, spring-tooth harrowing, and cultipacking. Cultivation took about 30 per cent of the total time spent on corn up to harvest. Most of the corn was cultivated with a two-horse one-row cultivator and there was even some done with a one-horse cultivator. There were no three-horse two-row cultivators in use, but two or three of the farmers used a two-horse two-row outfit which cultivated an average of 9.3 acres in a 10-hour day as compared to 6.4 acres for the one-row cultivator. The small fields are no doubt a factor retarding the introduction of the usual type of two-row cultivator.

Nine farmers owning tractors plowed about 90 per cent of their corn ground with this source of power and used tractors to do practically all of the disking and about two-thirds of the spring-tooth harrowing for corn. The tractor farms used an average of 12.4 hours of man labor, 16.2 hours of horse work, and 3.6 hours of tractor work per acre; while the farms where horses were the only source of power used 18.3 hours of man labor and 39.4 hours of horse work per acre in growing field corn up to harvest (Table 24).

The cost of labor and power was $11.44 per acre on the tractor farms as compared to $12.91 on the horse-operated farms. On the tractor farms the total cost of growing corn up to harvest was 73 cents per bushel, and on the farms without tractors the cost per bushel was 81 cents. Table 25 shows average amounts of labor expended per acre, by operations, on all corn fields of the two groups of farms.

Large fields are an important factor in reducing the cost of crop production because they favor the use of larger implements and reduce the amount of time lost in turning at the ends of the field. To show the effect of size of field on labor expenditure, all of the fields in corn, including silage, during the years 1920-1923, inclusive, were grouped according to size with the results as shown in Table 4.

TABLE 4.—Size of Field as Related to Labor Expended in Growing an Acre of Corn up to Harvest, on Tractor Farms and Horse Farms, 1920-1923

Item	Fields	Average size	Labor per acre			Cost of labor and power per acre
			Man	Horse	Tractor	
	No.	*A.*	*Hr.*	*Hr.*	*Hr.*	*Dol.*
Tractor farms, total	32	11.5	12.5	15.8	3.6	11.42
Fields under 5 acres	6	2.4	18.0	21.9	4.2	15.09
Fields 5 to 10 acres	8	8.3	14.0	15.9	4.0	12.34
Fields 10 to 15 acres	8	11.9	12.2	15.8	3.8	11.58
Fields 15 acres and over	10	19.2	11.2	14.7	3.3	10.46
Horse farms, total	91	7.8	17.9	39.0	.07	12.65
Fields under 5 acres	26	3.2	21.2	43.1	....	14.29
Fields 5 to 10 acres	37	7.4	18.1	39.5	.04	12.77
Fields 10 to 15 acres	23	11.8	17.2	37.5	.15	12.24
Fields 15 acres and over	5	16.5	15.2	34.7	....	10.99

On farms where tractors were owned it took 18.0 hours of man labor per acre of corn in fields of less than 5 acres in size; whereas it required only 11.2 hours per acre, or 38 per cent less when the corn was grown in fields of 15 acres or more. Total labor and power cost for growing an acre of corn up to harvest showed a decrease from $15.09 to $10.46, or 31 per cent less in the larger fields. On farms not owning tractors it took 28 per cent less man labor and the total cost of labor was 23 per cent less in large as compared to small fields. On this latter group of farms more than two-thirds of the corn fields were less than 10 acres in size and averaged only 5.6 acres. There would appear to be considerable opportunity for reducing the cost of crop production thru the rearrangement of the farm layout.

A difference in the ability of farmers to rush the work along is another factor causing variations in labor costs. The question might be raised as to how much more work per day some farmers accomplish than others. In Table 36 are data showing an average 10-hour day's work for various operations and given sizes of implements. Alongside this average of all farmers are the averages of that 25 per cent of the farmers who did the various operations in the shortest time per acre. An examination of these figures will show that the accomplishment of those who covered the most ground in a day varied from only 12 per cent more than the average day's work of all farmers in the operation of spring-tooth harrowing with 2 horses to 41 per cent more than the average in the case of shocking corn cut with a binder. For all operations taken as a whole it was about 23 per cent higher than the average, a goal worth striving for and not at all impossible for the individual farmer to reach.

Man-labor rates varied from 31.0 to 21.4 cents per hour. It is not to be assumed that the quality of work done is always proportional to the cost per hour. By planning the farm work for good distribution of labor and providing more work for the winter months it is possible to reduce the cost per hour of labor, especially if a year-round hired man is employed. The difference of 9.6 cents per hour, mentioned in the beginning of this paragraph, would, with the average amount of time spent per acre and average yields of corn, amount to a difference of 3.8 cents per bushel in the cost of producing corn, exclusive of any harvesting costs. In the cost per hour of horse work there was a very wide range from the high rate of 37.7 cents to only 13.3 cents per horse hour. With average amounts of horse work and average yields this difference of 24.4 cents per horse hour would account for a difference of 18.5 cents per bushel in cost of growing corn up to harvest. Here is a factor worthy of the consideration of every farmer. The amount of work that a horse does is the most important factor in determining the cost per hour of horse work. On Farm 12, which had the highest rate per horse hour, the horses worked an average of only 413 hours annually per horse, the least of all farms in the study. Whenever a tractor is bought and no reduction is made in the number of horses kept an increase in the cost per hour of horse labor is certain to result. Table 5 shows the relation between the amount of work done per horse and the cost per hour.

Since feed is the largest item in the cost of keeping horses, farmers should take advantage of the various opportunities that present themselves for reducing the cost of this item by following such practices as turning on pasture those horses that are not working, feeding grain in summer in proportion to the kind and amount of work being done, feeding only a light grain ration during the winter, discontinuing the excessive feeding of hay, and substituting cheaper or non-salable roughage such as oat straw or corn stover.

TABLE 5.—Hours of Work per Horse and Cost per Hour

Farms	Work per horse per year		Cost per hour
	Range	Average	
No.	*Hr.*	*Hr.*	*Ct.*
8	Under 700	642	23.1
7	700 to 799	750	20.7
8	800 and over	957	18.5

Other factors affecting cost per acre.—In addition to showing how labor and power costs vary and how they may be controlled it may be well to point out some of the other important controllable factors. For instance the cost of hauling and spreading manure ranged from $1.05 to 52 cents per load, depending largely on the efficiency of the different farmers and the individual rates for man labor and horse work. With the average number of loads of manure charged per acre of corn and average yields per acre, this difference of 53 cents per load in manure hauling costs would mean a difference of nearly five cents per bushel in cost of producing corn. Quantities of manure and fertilizer varied considerably but were reflected in the yields received. This factor will be discussed later. Overhead, largely under control of the farmer, varied from $3.19 to 75 cents per acre, amounting to a difference of 7 cents per bushel of corn on these two farms.

Yield per acre.—Differences in yields are one of the two main factors that are responsible for differences in the cost per bushel of grain, the other being those factors affecting cost of operation. Altho the farmer cannot control weather conditions which may be responsible for some of the variations in yield, he can control to a large degree such factors as crop rotation, care of the soil, selection of seed, and cultural practices. These 23 farms were divided into three groups based on yield per acre of corn. Table 6 shows the extent of various input factors entering into the cost of growing an acre of corn up to harvest, and the per-bushel cost in the three groups.

An examination of the table will show that so far as total labor expenditure is concerned there was little difference between the low-yield and high-yield groups. In fact the high-yield group had a lower labor and power cost per acre than did the other groups. Manure, fertilizer, and land charge (i. e. taxes and interest) totaled $11.72 per acre in the low-yield group and $17.83 in the high-yield group, a difference of $6.11 per acre accompanied by an increase of 18.7 bushels per acre in yield.

TABLE 6.—Costs of Growing Corn up to Harvest, on Cost-Account Farms Grouped According to Yield per Acre

Item	Under 35 bu. per acre		35 to 40 bu. per acre		Over 40 bu. per acre	
	Amt.	*Dol.*	*Amt.*	*Dol.*	*Amt.*	*Dol.*
Cost factors per acre:						
Man labor	15.8 hr.	4.38	16.2 hr.	4.49	16.5 hr.	4.59
Horse work	30.4 hr.	6.23	34.0 hr.	6.97	29.6 hr.	6.07
Tractor work	1.9 hr.	2.20	.8 hr.	.93	1.4 hr.	1.62
Equipment charge	....	2.29	....	2.01	....	1.99
Manure charge	2.0 loads	3.50	3.6 loads	6.30	4.5 loads	7.88
Fertilizer	172.3 lb.	2.21	177.7 lb.	2.28	221.3 lb.	2.84
Seed	9.7 lb.	.34	9.7 lb.	.38	10.0 lb.	.43
Overhead	....	1.88	....	1.73	....	1.86
Taxes on land	....	.96	....	1.06	....	1.20
Interest on land	....	5.05	....	5.15	....	5.91
Total	....	29.04	....	31.30	....	34.39
Yield per acre	31.1 bu.	....	36.7 bu.	....	49.8 bu.	....
Cost per bushel	....	.934	....	.853	....	.691

During the 5 years of the study corn in the crib had an average farm value of $1.00 per bushel. Deducting cost of harvesting, the value of the corn in the field at harvest time would have been about 80 cents per bushel. At that price a yield of only 31.1 bushels per acre would have paid for all costs except man labor and left the farmer a return of 22 cents per acre or less than 1.5 cents per hour of labor on corn. In the upper yield group the corn would have given the farmer a return of $10.04 per acre above all costs other than labor, or 60.8 cents per man-hour.

Table 7 will give an idea of some of the differences existing on the three groups of farms.

TABLE 7.—Some Factors Related to Yield of Corn on Farms in Study

Item	Less than 35 bushels per acre	35 to 40 bushels per acre	Over 40 bushels per acre
Number of farms	6	8	9
Per cent of crop area in corn	16.8	21.6	22.6
Per cent of crop area in timothy	19.7	14.6	10.0
Loads of manure, annually, per crop acre	1.8	2.1	2.8
Loads manure applied per acre of corn	3.3	4.9	7.4
Loads manure charged per acre of corn	2.0	3.6	4.5
Pounds fertilizer applied per acre of corn	172.3	177.7	221.3
Yield in bushels, per acre of corn	31.1	36.7	49.8

The figures on per cent of crop area in corn and in timothy indicate that those farmers with the best yields of corn were following the 4-year rotation more closely than were those who received the lowest yields. The farms in the high-yield group were more heavily stocked, as is indicated by the number of loads of manure hauled annually per crop acre. These farmers applied more than twice as many loads of manure to their corn ground, per acre, as did those in the low-yield group.

Date of planting as related to yield.—Timeliness of planting is important in securing a good yield of corn. In order to show the effect of date of planting on yield all of the corn fields were grouped according to average planting date. The results are shown in Table 8.

TABLE 8.—Date of Planting Corn, as Related to Yield, 23 Farms, 1920-1923

Date of planting	Acres planted	Per acre		
		Fertilizer*	Manure†	Yield
	No.	*Lb.*	*T.*	*Bu.*
Before May 20	118.0	233	3.5	45.8
May 21—25	97.2	174	4.5	44.3
May 26—31	272.7	180	3.4	39.8
June 1—5	35.1	265	4.0	37.2
June 6—10	24.4	217	3.4	28.4
Total	547.4	196	3.7	41.2

*Applied.
†Charged.

Very little corn planting was done before the middle of May. Medina County is well north in the State and the soils on most of these farms could be classed as cold and wet. Plantings made before May 20, largely on farms that were better tile drained than the average, made the best yields. Plantings delayed until three weeks later, i. e. until June 6th to 10th, made only 28.4 bushels per acre, this being 17.4 bushels or 38 per cent less than the yield of the early plantings. The table shows practically no difference in the amounts of fertilizer and manure per acre on the earliest and latest plantings. The four-year average corn-planting date on farms with tractors was three days earlier than on horse-operated farms.

COSTS OF HARVESTING

Of the total acreage of corn harvested for grain during the first four years of this study 56 per cent was cut with binders and 44 per cent cut by hand. Seventeen of the 23 farmers owned corn binders with which they cut 68 per cent of their field corn. The

6 farmers not owning binders cut 84 per cent of their field corn by hand, the rest having been cut with rented binders at silo-filling time.

Cost of cutting and shocking by two methods.—Five of the farmers cut all of their field corn by hand, 4 cut all of theirs with binders, and 14 used both methods. Table 9 shows the average cost per acre for each of the methods.

As an average for the four years, 10.7 hours of man labor were spent per acre when the corn was cut and shocked by hand, and only 5.8 hours of man labor and 4.2 hours of horse work when cut with a binder and shocked by hand. Thus the corn binder and horses increased the work accomplished per hour of man labor about 85 per cent. This is a big advantage, and the figures on total cost per acre need further explanation. When corn is cut and shocked by hand it is seldom possible to hire this work at the year-round wage rate for labor such as was used in this table. Since a corn binder is regarded as almost a necessity at silo-filling time it would be false economy for farmers owning binders not to use them for cutting their field corn. A good share of the binder costs, namely interest on investment and part of the depreciation at least would go on just the same, even tho the binder were standing idle. Then too the horse-work cost charged against this method should be discounted, inasmuch as the horses would not be in demand for any other work just then.

Cost of cutting and shocking by hand ranged from $2.27 to $4.45 per acre; the range in cost of cutting with a binder and shocking by hand was from $3.14 to $4.86. (See Tables 26 and 27.) Corn binders were drawn by either 2 or 3 horses in about an equal number of cases, the two-horse team cutting an average of 5.5 acres per 10-hour day and the 3-horse team an average of 6.2 acres. The accomplishments of the 25 per cent of the farmers who cut the most per day were found to be 7.0 acres per 10 hours with two horses and 7.8 acres with three.

Cost of husking by three methods.—Three different methods were used in completing the harvesting of corn grown for the grain: (1) corn husked by hand in the field; ears hauled to the crib; stover tied in bundles, shocked, and later hauled in for feed; (2) shocks hauled into barn principally on sleds; corn husked out by hand on barn floor; stover tied in bundles and fed as needed; (3) shock corn hauled in and run thru the husker-shredder, a machine which husks out the ears and shreds the stover at the same time. Fifty-two per cent of the corn was husked by the first

TABLE 9.—Cost of Cutting and Shocking Corn, by Two Methods, 1920-1923

Method	Per cent of total corn cut	Number of farms	Labor per acre					Cost per acre					
			Cutting		Shocking	Total		Man labor	Horse work	Twine		Equip-ment	Total
			Man	Horse	Man	Man	Horse			Amt.	Cost		
			Hr.	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Dol.*	*Dol.*	*Lb.*	*Dol.*	*Dol.*	*Dol.*
Cutting and shocking by hand	44	19	10.7	......	......	10.7	......	2.97	....	0.5	.06	.....	3.03
Cutting with binder, shocking by hand	56	18	1.7	4.2	4.1	5.8	4.2	1.61	.91	2.9	.36	.80	3.68
Weighted average	100	23	5.7	2.4	2.3	8.0	2.4	2.21	.51	1.8	.23	.45	3.40

method, 35 by the second, and 13 by the third. Table 10 shows the average amounts of man labor and horse work spent per acre in each of the three methods.

Husking by hand, whether in the field or at the barn, was a very slow process. These farmers with small acreages of corn have not found it necessary to develop the speed in husking that is found in the corn-belt section of the State. Practically all of the corn on these Medina County farms was drilled a little thicker than is generally recommended; so there was a larger proportion of small ears and nubbins than is found in the cornbelt. Another thing tending to increase the labor requirements for husking by hand was the fact that much of the corn was husked in short intervals of an hour to less than three hours, resulting in a large proportion of lost time. An average of 19.8 hours total of man labor per acre was spent in husking in the field and in tying and shocking the stover. This was at the rate of only 2.1 bushels of corn per hour. The amount of corn husked in the field ranged from 1.5 bushels to 2.9 bushels per hour. An average of 3.7 hours of man labor and 5.2 hours of horse work per acre was spent in cribbing. An average of 11 bushels was cribbed per hour of man labor, the amounts cribbed per hour ranging from 8.0 bushels to 13.1 bushels per hour, depending on size of load hauled, distance to the field, size of the ears, and agility of the worker. Most of the corn was hauled to the crib in small loads of 30 bushels or less and all scooped off by hand. Hauling an acre of stover required an average of 4.6 hours of man labor and 5.8 hours of horse work; the average estimated yield of stover was 1,843 pounds per acre.

Total labor used in connection with the method just described amounted to a little less than when corn was husked at the barn. The hauling of shock corn, in the second method, required more labor than cribbing of corn and hauling of stover combined. This was because of the inconvenience of digging many of the shocks loose from the frozen ground and the fact that shock corn was hauled to the barn in smaller loads than was the case with stover. Barn husking was done principally in inclement weather during the months of December to February. This method required much labor, but even so was better than letting the corn shocks stand out until March or April.

The third method, employed the least of all, merits wider use. Shredding required only about half as much man labor as the average of the other two methods. If the added convenience of barn feeding of shredded stover and the ease of handling manure made

TABLE 10.—Labor of Husking Corn and Hauling in Stover, by Three Methods, 1920-1923

Method	Number of farms	Labor per acre											
		Husking corn*		Cribbing corn†		Hauling stover		Hauling shock corn		Shredding‡		Total	
		Man	Horse	Man	Horse	Man	Horse	Man	Horse	Man	Horse	Man	Horse
		Hr.	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*
No. 1, husked by hand, in field	21	19.2	3.8	3.7	5.2	4.6	5.8	....	....	......	.. ....	27.5	14.8
No. 2, husked by hand, at barn	16	20.4	....	....	....	....	....	10.6	13.6	....	....	31.0	13.6
No. 3, husked with shredder	6	....	.....	.. ...	....	....	....	....	....	14.3	11.9	14.3	11.9

*Includes tying stover in bundles, (and shocking stover in the field in Method No. 1).
†Includes picking up and hauling the ears.
‡All the labor including hauling in the shocks to the machine and cribbing the corn.

from shredded stover as compared to long stover are taken into account this method has much in its favor as a labor-saving practice. The amounts of labor used in shredding varied from 11.2 man hours and 7.8 horse hours per acre, on one farm with a yield of 32.2 bushels per acre, to 15.7 man hours and 15.5 horse hours on another farm with a yield of 53.4 bushels per acre. Less labor per bushel was required on the farm with the larger yield per acre.

Total cost per acre for each of the three methods is shown in Table 11.

TABLE 11.—Total Cost of Husking Corn and Hauling in Stover, by Three Methods, 1920-1923

Method	Yield per acre		Labor per acre		Cost per acre				
	Corn	Stover	Man	Horse	Man labor	Horse work	Equipment	Shredder charge*	Total
	Bu.	*Lb.*	*Hr.*	*Hr.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
No. 1, husked by hand, in field	41.0	1843	27.5	14.8	7.51	3.05	0.30	....	10.86
No. 2, husked by hand, at barn	41.4	1934	31.0	13.6	8.71	2.80	.29	....	11.80
No. 3, husked with shredder.......	41.2	1888	14.3	11.9	4.14	2.42	.32	3.96	10.84
Weighted average...	41.2	1880	27.0	14.0	7.49	2.88	.30	.51	11.18

*Includes fuel and power.

Husking with a shredder shows up to slightly best advantage even tho the shredder charge averaged nearly 10 cents per bushel. Most of the shredding was done by custom outfits and the complete shredding charge, including fuel and power, ranged from approximately 8 to 10 cents per bushel. One farmer-owned outfit cost over 12 cents per bushel and this ran the average up to approximately 10 cents. In determining whether shredding pays, the farmer has to decide whether he would rather spend an extra 15 hours or so of labor per acre or pay out the cash for the use of a shredder outfit, which would generally be about 8 cents per bushel. Another thing that should be taken into account is the difference in convenience of handling the harvested crop and the fact that the refuse or uneaten portion of the shredded stover makes better bedding and more easily handled manure than does long stover.

Total cost of harvesting.—For the purpose of assembling the total costs of harvesting corn, Table 12 is presented, being for the most part a combination of Tables 9 and 11.

Table 12 shows, for the different combinations of methods, all costs including cutting and shocking the corn in the field, husking and cribbing the corn, and hauling the stover to the barn or feed lot. An examination of this Table and Table 24 shows that, as an average for all farms, the man labor used in harvesting is more than two-thirds of the total labor spent in producing the entire crop. This suggests the importance of attempting to reduce the labor cost of harvesting corn.

TABLE 12.—Total Cost of Harvesting Corn and Stover, 1920-1923

Method	Total labor per acre		Cost per acre					
	Man	Horse	Man labor	Horse work	Twine	Equipment	Shredder*	Total
	Hr.	*Hr.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Cut by hand, husked by hand, in field	38.2	14.8	10.48	3.05	0.06	0.30	....	13.89
Cut by hand, husked by hand, at barn	41.7	13.6	11.68	2.80	.06	.29	....	14.83
Cut by hand, husked with shredder	25.0	11.9	7.11	2.42	.06	.32	3.96	13.87
Cut with binder, husked by hand, in field	33.3	19.0	9.12	3.96	.36	1.10	....	14.54
Cut with binder, husked by hand, at barn	36.8	17.8	10.32	3.71	.36	1.09	....	15.48
Cut with binder, husked with shredder	20.1	16.1	5.75	3.33	.36	1.12	3.96	14.52
Average, all methods	35.0	16.4	9.70	3.39	.23	.75	.51	14.58

*Includes fuel and power.

The method employing the most machinery, i. e. cutting with a binder and husking with a shredder, took less than half as much labor as the second method and in spite of the high machinery and shredder charges did the work at a lower cost per acre. There were not enough instances of shredding to make any comparison as to the time required to shred corn cut by hand and with a binder; so, in this combination table, shredding labor was figured the same in both cases. This penalized the binder-shredder method since there is no doubt that bundles are handled more quickly, both in loading in the field and unloading at the shredder, than loose shock corn.

CORN FOR SILAGE

Practically the same cultural practices were followed in growing silage corn and corn for grain. The kind and amount of seed used was the principal difference. Most of the seed for silage was purchased, rather than grown locally as was the case with much of the field corn. Silage corn was drilled 25 to 30 per cent thicker than corn that was to be harvested for grain and as a general thing was planted after the field corn was planted so that the latter might have advantage of as long a growing season as possible.

COSTS OF GROWING UP TO HARVEST

The farm-to-farm cost of growing silage corn up to harvest ranged from $3.70 to $7.63 per ton, the average being $4.74. (See Table 28.) The farm with the lowest cost per ton had the lowest total cost per acre, and the one with the highest cost per ton had the lowest yield per acre. It would be largely repetition to do more than name the factors contributing to a low cost per ton, namely low operating expenses per acre, high yields per acre, or both, these having been discussed in previous sections under "Corn for Grain."

COSTS OF HARVESTING

· **Costs of harvesting corn and silage compared.**—It is generally assumed that the amounts of labor required to harvest corn and silage are about equal. Table 13 shows that on this group of farms less than half as much man labor was spent in harvesting an acre of silage as was spent on an equal area of corn harvested for grain.

TABLE 13.—**Comparative Costs of Harvesting Corn for Grain and Silage, 1920-1923**

Item	Total labor per acre		Cost per acre					
	Man	Horse	Man labor	Horse work	Twine	Equipment	Shredder, cutter	Total
	Hr.	*Hr.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Grain and stover*.	35.0	16.4	9.70	3.39	0.23	0.75	0.51	14.58
Silage........	16.7	15.5	4.56	3.32	.40	.96	4.23	13.47

*Average for total acreage of field corn.

On this group of farms the harvesting of silage was largely machine work, 92 per cent of it having been cut with a binder. Only 56 per cent of the corn harvested for grain was cut with a binder and only 13 per cent of the husking was done with a shredder. In spite of the fact that silage is harvested when there is more weight to be lifted, it took less labor on these farms than the binder-shredder method of harvesting corn for grain. (See Table 12).

Variations in cost per ton.—The total cost of harvesting silage ranged from $1.46 to $2.65 per ton, the average being $1.96. (See Table 29). Ninety-two per cent of the total area of silage corn was cut with a corn binder. The average amounts cut with a binder in a ten-hour period varied from 4.6 acres to 7 acres on the different farms. Silo-filling crews varied in size considerably, the average being 12 men and 10 horses, besides the man with the engine or tractor operating the ensilage cutter. There was considerable range in the efficiency of the silo-filling crews, as measured by the total amount of time spent per ton. Silo-filling labor ranged from 1.5 man hours and 1.2 horse hours to 3.2 man hours and 2.4 horse hours per ton.

Relationship between yield per acre and cost of cutting.—On farms whose yields of silage were less than 6 tons per acre and averaged 5.4 tons the cost of cutting (including man labor, horse work, binder charge, and twine) was $2.54 per acre or 47 cents per ton; on the farms securing more than 7.5 tons per acre or an average of 8.3 tons, the cost of cutting was $2.94 per acre or 35 cents per ton. Thus an increase of 54 per cent in yield was accompanied by only a 16 per cent increase in cost of cutting an acre, so that the cost of cutting a ton was decreased 25 per cent.

Large and small silo-filling crews compared.—In order to show the relative efficiency of different sized silo-filling crews the records were divided into two groups, as in Table 14.

TABLE 14.—**Relative Efficiency of Large and Small Silo-Filling Crews**

Items	Farms with larger than average crews	Farms with smaller than average crews
Average crew:		
Men..................No...	14	10
Horses..................No...	12	8
Average distance, silo to center of field.........rods..	100	82
Yield per acre..................tons..	6.92	6.87
Silage made per hour of filling..................tons..	6.1	5.7
Total labor per acre:		
Man labor..................hours .	16.1	12.6
Horse work..................hours..	13.1	10.2
Total labor per ton:		
Man labor..................hours..	2.3	1.8
Horse work..................hours..	1.9	1.5
Silage made per hour of total man labor. . ..tons..	.43	.54

On the farms using silo-filling crews made up of more men and teams than the average there was more time lost waiting in line to unload at the cutter or on account of repairs being made than in the case of smaller-than-average crews. The average yield per acre was about the same in each group, and the average capacity of the cutters was nearly equal as shown by the number of tons of silage put up per hour of filling. The average distance to the fields was slightly greater in the group using the larger crews but this difference would not account for a total of more than one-half man hour per acre. The figures on amount of silage made per hour of total man labor show that the smaller crews were about 25 per cent more efficient than the larger crews.

OATS

Farm-to-farm variations in costs.—The cost of producing oats on the different farms ranged from 36 cents to 88 cents per bushel, the average being 60 cents. (See Table 30.) The farmer who produced oats at the lowest cost per bushel had a yield per acre that was about 37 per cent above the average of the entire group and a total cost per acre 17 per cent less than the average. Efficiency in these two general factors resulted in a cost per bushel that was only three-fifths as high as the average cost. What then are the factors that are responsible for differences in the cost of producing a given area of oats on the one hand, and what are some of the reasons why yields vary on the other?

Variations in labor and power costs.—This factor is one of the principal reasons for wide variations in the per-acre cost of producing crops. As an average for all farms, the total cost of man labor and horse and tractor work made up practically one-third of the total cost of producing oats. Cost of labor and power averaged $8.77 per acre and ranged from $5.91 to $13.04 per acre. Among the factors responsible for this range and largely under the farmer's control are: size of implements and teams used; source of power, i. e. horses or tractors; size and shape of fields; methods of seed-bed preparation; threshing methods; timeliness of performing various operations; difference in what individual farmers regard as a good day's work; and variations in man-labor and horse-work rates.

The seed bed for about 85 per cent of the total area in oats was plowed, and the operation of plowing required nearly 55 per cent of all the work on oats up to harvest time. This apparently is the first place to look for possible savings in labor and power costs. The time spent in plowing an acre varied from 1.3 to 2.5 hours when done with a tractor and from 2.6 to 7 hours per acre when plowed with horses, indicating considerable room for improvement on some of the farms. The two-horse walking plow turned an average of 1.9 acre per 10-hour day; while with three horses and a sulky plow the average day's work was 2.4 acres.

The possible saving in man labor and horse work brought about by the use of a tractor is shown in Table 31. In preparing the seed bed for oats, those farmers who did part of the work with a tractor used only 60 per cent as much man labor and less than one-fourth as much horse work as those using horses alone. The use of a tractor to the extent of 2.2 hours per acre made possible a saving of 2.5 hours of man labor and 12.1 hours of horse work per acre. The total cost of power and labor for all operations including harvesting oats was $8.31 per acre on farms using tractors and horses, and $9.09 per acre on farms where horses furnished the power, there being a slight advantage in favor of the tractor farms.

Large fields are not quite so important a labor-saving factor in the production of oats as they are in the case of corn where much more turning is necessary. Before harvest time these farmers went over their oat fields an average of 4.3 times; while to prepare the seed bed, plant, and cultivate their corn they went over the fields an average of 11.3 times. In plowing for oats only 1.8 acres were turned per 10-hour day in fields having less than 5 acres; in fields of more than 15 acres the average day's plowing with horses was 2.5 acres.

The amounts of man labor and horse work per acre of oats were greatly reduced where the seed bed was not plowed but disked, a practice followed on about one-sixth of the total acreage in oats. To make the figures comparable, the labor records of 5 farms on which part of the seed bed for oats was plowed and part disked are shown in Table 15.

TABLE 15.—Disking for Oats vs. Plowing: Seed-Bed Preparation and Other Labor, Average of 5 Farms, 1920-1924

Operation	Seed bed disked				Seed bed plowed			
	Times over	Total labor per acre			Times over	Total labor per acre		
		Man	Horse	Tractor		Man	Horse	Tractor
		Hr.	*Hr.*	*Hr.*		*Hr.*	*Hr.*	*Hr.*
Plowing	....	....	....	....	.9	4.54	8.65	.46
Disking	1.1	.98	1.95	.28	.2	.16	.52	.03
Spring-tooth harrowing	1.2	.93	1.17	.50	.5	.35	.44	.13
Rolling	.2	.16	.32	....	1.4	1.02	2.04	....
Spike-tooth harrowing	.4	.28	.74	....	1.6	1.29	3.39	....
Total seed-bed preparation	2.9	2.4	4.2	.8	4.6	7.4	15.0	.6
Drilling	1.0	1.1	2.2	....	1.0	1.1	2.2	....
Cutting and shocking	....	3.4	2.6	.2	....	3.2	2.6	.2
Threshing	....	4.5	3.4	....	....	4.3	3.2	....
Total labor	....	11.4	12.4	1.0	....	16.0	23.0	.8

For preparing that part of the seed bed which was disked a total of 2.4 man hours, 4.2 horse hours, and .8 tractor hour was spent per acre, while seed-bed preparation on the plowed part took 7.4 man hours, 15.0 horse hours, and .6 tractor hour per acre. Total cost of labor and power for the production of oats, including harvesting, was $6.28 per acre for the part which was disked as compared to $9.11 per acre where the seed bed was plowed. Total cost per acre and per bushel will be discussed later.

Approximately one-third of all the man labor employed in the production of oats was used in threshing. A comparison of two methods of threshing is shown in Table 16.

That most of the farmers felt it was more advantageous to thresh directly from the shock rather than stack the bundles at the barn and thresh later is shown by the fact that 80 per cent of the total acreage of oats were threshed by the former method. Stacking and stack-threshing required just 50 per cent more man labor per acre than shock-threshing. In a community where threshing machines are readily available there appears to be no economic advantage in stack-threshing. But if a farmer finds that he is going to be forced to wait until late in the season to thresh, the saving of grain and getting the shocks off the field, so that plowing for wheat will be timely, may be factors in favor of stack-threshing. On these farms the labor cost of threshing, at 30 cents per hour, amounted to 4.6 cents per bushel in the case of stacking and stack-threshing and 3.3 cents per bushel for the oats that were shock-threshed, a difference in cost that is smaller than commonly supposed.

TABLE 16.—Oats: Stack-Threshing vs. Shock-Threshing, Cost-Route Farms, 1920-1924

Item	Stacked and stack-threshed	Threshed from shock
Threshed by each method........per cent..	20.0	80.0
Yield per acre........bushels..	41.3	38.2
Man labor per acre:		
Hauling and stacking........hours..	3.4	....
Threshing........hours..	2.9	4.2
Total........hours..	6.3	4.2
Horse work per acre:		
Hauling and stacking........hours..	3.7	....
Threshing........hours..	.1	3.6
Total........hours..	3.8	3.6
Normal threshing dates........	Sept. 1 to Oct. 15	Aug. 5 to Sept. 5

Little need be said concerning timeliness of performing the various operations as related to saving of labor. Those familiar with farming know that much less work is required to get a seed bed in proper condition for planting if the plowing is done when the moisture content of the soil is right. If seeding is not done at the proper season, rains may necessitate an additional harrowing before the seed can be sown. The effect of wet weather on getting the work done at the proper season can be mitigated by an increased use of tile drainage, and by pushing the work to completion during favorable weather, a factor that varies considerably among individual farmers.

The cost per hour of man labor varied from 31 cents to 21.4 cents while the range in the cost of horse work was from 37.7 cents to 13.3 cents per hour. It is evident that any reduction that might be made in the hourly cost of man labor or horse work would be reflected in a lower cost of producing crops. With average amounts of labor and average yields of oats the above variation of 9.6 cents in cost per hour of man labor would account for a difference of 3.4 cents per bushel; while a reduction of 24.4 cents per horse hour would mean a decrease of 12.1 cents per bushel in the cost of producing oats.

TABLE 17.—Cost of Producing Oats on Cost-Route Farms Grouped According to Yield per Acre, 1920-1924

Item	Under 35 bushels per acre		35 to 40 bushels per acre		Over 40 bushels per acre	
	Amt.	*Dol.*	*Amt.*	*Dol.*	*Amt.*	*Dol.*
Cost factors per acre:						
Man labor	13.6 hr.	3.71	14.2 hr.	3.89	13.6 hr.	3.71
Horse work	20.0 hr.	4.11	22.4 hr.	4.61	14.8 hr.	3.04
Tractor work	1.1 hr.	1.15	.5 hr.	.51	1.5 hr.	1.51
Equipment charge		1.40		1.42		1.21
Manure	1.8 T.	3.24	2.0 T.	3.56	2.4 T.	4.18
Fertilizer	124.3 lb.	1.47	132.8 lb.	1.57	175.3 lb.	2.07
Seed	2.6 bu.	1.74	2.5 bu.	1.73	2.5 bu.	1.69
Twine, fuel, threshing		2.03		2.20		2.68
Taxes on land		1.10		.83		1.29
Interest on land		4.96		5.45		6.07
Overhead		.96		.95		1.29
Total cost per acre		25.87		26.72		28.74
Straw credit	1309 lb.	3.27	1467 lb.	3.67	1982 lb.	4.96
Net cost of grain		22.60		23.05		23.78
Yield per acre	33.0 bu.		37.6 bu.		47.1 bu.	
Cost per bushel		.684		.613		.505

Yield per acre.—The importance of good yields is shown in Table 17, in which the farms were grouped according to the average yield secured. In the first placė the table shows that high yields of oats were obtained without the use of large amounts of labor per acre; in fact, the total per-acre cost of labor and power was less in the highest-yield group than in the other two. This would indicate that there are some factors that are more important than the amount of time spent in fitting the seed bed. As the yield increases an increase is noted in the amount of farm manure charged to oats as well as in the actual amount of commercial fertilizer applied. To make all three groups comparable some further account must be taken of the natural fertility of the soil. It may be assumed that this is fairly well measured by the taxes and interest charge. The total cost of manure, fertilizer, taxes, and interest in the low-yield group was $10.77 per acre as compared to $13.61 for the high-yield group, the increased cost of $2.84 per acre being accompanied by an increase of 14.1 bushels in yield, a good return on the investment. During this 5-year period the average farm value of oats was 58 cents per bushel. The table indicates that those farmers getting less than 40 bushels of oats per acre were either not making 5 per cent interest on the value of their land or not realizing a wage of 30 cents per hour for the time spent on the oat crop.

TABLE 18.—Disking for Oats vs. Plowing: Cost per Acre and per Bushel, Averages of 5 Farms, 1920-1924

Item	Seed bed disked		Seed bed plowed	
	Amt.	*Dol.*	*Amt.*	*Dol.*
Cost factors, per acre:				
Man labor	11.4 hr.	3.04	16.0 hr.	4.27
Horse work	12.4 hr.	2.35	23.0 hr.	4.13
Tractor work	1.0 hr.	.89	.8 hr.	.71
Equipment charge	....	.88	....	1.20
Manure	1.6 T.	2.93	1.6 T.	2.93
Fertilizer	138.3 lb.	1.54	135.0 lb.	1.50
Seed	2.5 bu.	1.59	2.5 bu.	1.59
Twine	2.4 lb.	.29	2.2 lb.	.27
Coal	68.0 lb.	.23	63.0 lb.	.21
Threshing charge	....	1.52	....	1.41
Taxes on land	....	1.16	....	1.16
Interest on land	....	4.80	....	4.80
Overhead	....	.90	....	.90
Total cost per acre	....	22.12	....	25.08
Straw credit	1291 lb.	3.23	1274 lb.	3.19
Net cost of grain	....	18.89	....	21.89
Yield per acre	34.2 bu.	....	31.7 bu.	....
Cost per bushel	....	.552	....	.690
Average seeding date	April 26		May 4	

Reference has been made to the effect of different methods of seed-bed preparation on power and labor costs. In Table 18 is shown the total cost of production of oats sown in a seed bed that had been disked as compared to a seed bed that was first plowed. Oats grown on a disked seed bed made a slightly better yield and, because of the lower per-acre cost, were produced at 55 cents per bushel as compared to 69 cents on the plowed seed bed. Part of the difference in yield was undoubtedly due to the difference in date of seeding. In both methods corn occupied about 80 per cent of the area of the previous crop. The figures on yield and cost per acre indicate that disking for oats is a practice that might well be put into further use in this area on farms that are not too weedy. Besides the farms included in Table 18 there were two others on which all of the oats were sown on a disked seed bed. These farms secured yields of 41 and 51 bushels of oats per acre.

TABLE 19.—Date of Sowing Oats as Related to Yield, 23 Farms, 1920-1924

Date of sowing	Acres sown	Yield per acre
	No.	*Bu.*
Before April 24	227.2	48.0
April 24 to May 7	546.9	37.7
May 8 and later	221.0	32.3
Total	995.1	38.8

Date of seeding of oats has an important effect on yield, as shown in Table 19. All of the oat fields were arranged in three groups according to date of seeding. More than one-half of the area was sown during the last week in April and the first week in May. The table shows that seedings made before the last week in April produced almost 50 per cent more per acre than oats seeded after the first week in May.

WHEAT

Farm-to-farm variations in costs.—The cost of producing wheat on individual farms for the 4 years, 1921 to 1924, ranged from 98 cents to $2.33 per bushel, the average of all farms being $1.49. The low-cost producer had the highest yield, namely 28.6 bushels per acre, this being nearly 60 per cent more than the average of all farms; whereas his cost per acre was only 4 per cent more than average. The farmer with the highest cost per bushel had a yield which was 23 per cent less than average and a cost per acre which was 21 per cent above the average. (See Table 32).

Causes of variations in costs.—To enumerate the various factors that are responsible for variations in costs of producing wheat would be repeating in part what was said under "Oats". It may suffice here to discuss a few specific points.

Horse and tractor farms compared.—A comparison of wheat production costs on tractor and non-tractor farms is shown in the averages at the bottom of Table 32. The principal point of difference lies in the amounts of man labor and horse work used on the two groups of farms. This is shown in more detail in Table 33. Total labor and power costs were about $2.00 an acre less where tractors furnished part of the power than on the group of farms not owning tractors. More commercial fertilizer was applied per acre on the tractor farms but this difference was made up by the larger manure charge on the other group. The tractor farms secured a slightly higher yield per acre and, because of approximately a $2.00 an acre lower cost, produced wheat at a cost of $1.40 per bushel as compared to $1.56 on the horse farms. It may be of interest to know that the tractor farms had an annual average of 21 acres of wheat per farm yielding a total of 384 bushels while the other group had an average of 14 acres making 249 bushels.

Effect of rotation on costs.—Wheat generally followed oats, altho a few farmers sometimes omitted oats from the rotation and sowed their wheat on disked corn-stubble ground. To show the effect of the two systems, and eliminate as many of the other varying factors as possible, a study was made of the records of 7 farms on which about 60 per cent of the seed bed for wheat was plowed oat-stubble and 40 per cent disked corn-stubble ground.

TABLE 20.—Wheat: Effect of Rotation on Costs, Averages of 7 Farms, 1921-1924

Item	Wheat following corn		Wheat following oats	
	Amt.	*Dol.*	*Amt.*	*Dol.*
Cost factors, per acre:				
Man labor	7.7 hr.	2.08	15.5 hr.	4.22
Horse work	10.8 hr.	2.18	27.0 hr.	5.42
Tractor work	.5 hr.	.61	1.3 hr.	1.47
Equipment charge		1.01		1.55
Manure	2.3 ton	4.08	1.4 ton	2.47
Fertilizer	253.0 lb.	3.51	230.0 lb.	3.19
Seed	2.0 bu.	3.28	2.1 bu.	3.31
Twine, fuel, threshing		1.15		1.54
Taxes on land		1.14		1.14
Interest on land		5.25		5.25
Overhead		.80		1.35
Total cost per acre		25.09		30.91
Straw credit	1247 lb.	3.12	1620 lb.	4.05
Net cost of grain		21.97		26.86
Yield per acre	13.0 bu.		18.0 bu.	
Cost per bushel		1.69		1.49

Table 20 shows that total power and labor costs were more than twice as great on the part where the wheat followed oats. A small part of this difference was of course due to harvesting and threshing the larger yield secured on the area where the previous crop was oats. On these fields that were plowed, an average of 6.4 man hours and 15.1 horse hours more per acre was spent in seedbed preparation work alone, and 1.4 man hours and 1.1 horse hours more per acre in harvesting and threshing.

Perhaps the next most important point in the table is the difference of 5 bushels an acre in favor of oats as a crop preceding wheat, even tho the disked corn-stubble area received more fertilizer and, because of its position in the rotation, a higher charge for manure. The higher yield of wheat on the plowed oat-stubble area more than compensated for the higher total cost per acre, the cost per bushel being $1.49 as compared to $1.69 on the disked corn-stubble seed bed. The question may arise as to how much of the difference of 5 bushels in yield was due to the previous crop and how much to the method of seed-bed preparation. The two factors are almost inseparable, as disking of oat-stubble or plowing of corn-stubble ground for wheat are quite uncommon. It would appear that the practice of having wheat follow corn (or in other words, disking for wheat), as carried out on these northeastern Ohio farms, was not an economical practice even tho it afforded a considerable saving of labor. Waiting for the corn to mature and putting it into the silo or shock delayed wheat seeding too far beyond the optimum date. This suggests the use of earlier maturing varieties of corn. The average wheat seeding date on the disked area (i. e. following corn) was October 9; whereas the average date of seeding the plowed part was October 2. This might account for 2 or 3 bushels of the difference in yield.

Date of plowing as related to yield.—The records of the plowed fields of these farmers were grouped according to average date of plowing. The average plowing dates and yield of wheat per acre for the several groups of fields were as follows:

Before August 21	21.0 bushels
August 21 to 31	19.5 bushels
September 1 to 10	18.0 bushels
September 11 and later	16.3 bushels

It may be of interest to note that the average plowing date on tractor farms was August 20 as compared to August 29 on horse-operated farms. Early plowing generally makes it possible to have a more compact seed bed. It also means a greater supply of moisture and nitrates in the soil at seeding time.

Date of seeding and yield of wheat.—The records of the plowed fields were next grouped according to seeding dates, with results as shown in Table 21. About 85 per cent of the wheat was sown after the fly-free date. Those who took the risk of seeding earlier obtained a very slight advantage over those who waited. All but 22 acres of that classed as seeded September 21 to 30 were sown the last four days of that month. A delay of sowing until the first 10 days of October reduced the yield 4 bushels below that of the last of September seedings. Those made later than October 10 produced only 15.2 bushels per acre.

TABLE 21.—Average Seeding Date on Plowed Seed Bed and Yield of Wheat, 21 Farms, 1921-1924

Seeding date	Acres sown	Average yield
	No.	*Bu.*
Before September 21	103.3	21.7
September 21 to 30	260.8	21.2
October 1 to 10	231.1	17.2
October 11 and later	81.4	15.2

Stack-threshing versus shock-threshing.—Less than one-fourth of the wheat was stacked before threshing, the common practice being to thresh directly from the shock. The latter method required only a little more than half as much man labor per acre as the work of hauling, stacking, and stack-threshing combined. When the labor cost is reduced to a bushel basis it is evident there might be occasions when the better quality of the stacked grain would pay for the difference.

TABLE 22.—Wheat: Stack-Threshing vs. Shock-Threshing

Item	Stacked and stack-threshed	Threshed from shock
Threshed by each method ..... per cent	23.4	76.6
Yield per acre ..... bushels	20.3	17.3
Man labor per acre:		
Hauling and stacking ..... hours	3.9	.....
Threshing ..... hours	3.5	3.8
Total ..... hours	7.4	3.8
Horse work per acre:		
Hauling and stacking ..... hours	3.7	.....
Threshing ..... hours	.4	3.2
Total ..... hours	4.1	3.2
Man labor,* per acre ..... dollars	2.22	1.14
Man labor, per bushel ..... dollars	.109	.066

*At 30 cents per hour.

Yield as related to costs.—A yield of 20 bushels an acre is generally regarded as being the dividing line between profit and loss in wheat raising. The wheat cost records were grouped into three classes, according to yield per acre. Seven farms produced less than 17 bushels per acre, ten made between 17 and 20, and five of them had yields of more than 20 bushels. The results of the grouping are shown in Table 23.

An increase is noted in the amounts of man labor and horse and tractor work spent per acre as yields increased. This was due to the larger labor requirements for threshing the higher yields, as

TABLE 23.—Costs of Producing Wheat on Cost-Route Farms Grouped According to Yield per Acre, 1921-1924

Item	Under 17 bushels per acre		17 to 20 bushels per acre		Over 20 bushels per acre	
	Amt.	*Dol.*	*Amt.*	*Dol.*	*Amt.*	*Dol.*
Cost factors per acre:						
Man labor	11.4 hr.	3.14	17.3 hr.	4.75	20.9 hr.	5.73
Horse work	19.7 hr.	3.96	24.4 hr.	4.91	28.1 hr.	5.65
Tractor work	.7 hr.	.74	1.6 hr.	1.75	2.7 hr.	2.85
Equipment charge	....	1.14	....	1.86	....	1.99
Manure	2.1 T.	3.67	1.5 T.	2.67	1.9 T.	3.28
Fertilizer	261.8 lb.	3.50	237.1 lb.	3.17	273.0 lb.	3.65
Seed	2.0 bu.	3.27	1.9 bu.	3.09	1.8 bu.	2.87
Twine	1.9 lb.	.24	2.4 lb.	.30	2.9 lb.	.35
Fuel	....	.14	....	.21	....	.21
Threshing	....	.89	....	1.16	....	1.45
Taxes on land	....	1.21	....	.98	....	1.44
Interest on land	....	4.96	....	5.28	....	6.32
Overhead	....	1.06	....	1.14	....	1.22
Total cost per acre	....	27.92	....	31.27	....	37.01
Straw credit	1332 lb.	3.33	1774 lb.	4.43	2287 lb.	5.72
Net cost of grain	....	24.59	....	26.84	....	31.29
Yield per acre	14.3 bu.	....	18.7 bu.	....	23.4 bu.	....
Cost per bushel	....	1.72	....	1.44	....	1.34

well as to the fact that those getting the better yields plowed a larger proportion of their seed bed. Only 55 per cent of the seed bed of the low-yield group was plowed, while 99 per cent of the high-yield group was so prepared.

The table shows that those who received less than 20 bushels per acre were not making very good wages for their labor while those who made over 20 bushels per acre made a narrow margin of profit. The average selling price of wheat for the 5-year period was $1.41 per bushel.

MIXED CLOVER AND TIMOTHY HAY

Practically all of the wheat and a few of the oat fields were seeded down with a mixture of clover and timothy. The average rate of seeding was 5.3 pounds of red clover, 2.2 pounds of alsike, .4 pound of alfalfa and sweet clover, and 4.1 pounds of timothy seed per acre. The hay cut the first year following the small grain was a mixture of about half clover and half timothy; while that from meadows allowed to stand another year was practically straight timothy. In the cost tables pertaining to hay all clover seed was charged to the cost of producing mixed hay. If a meadow stood two years then half of the timothy seed was changed to mixed hay and half to timothy.

Variations in costs per ton.—The cost of producing mixed hay on the 23 farms varied from $6.26 to $16.25 per ton, the average being $9.86. (See Table 34.) The amounts of labor per ton varied from 3.4 man hours and 5.1 horse hours on Farm 5 to 8.2 man hours and 8.8 horse hours on Farm 8. The amounts of hay cut per 10 hours ranged from 12.4 to 7.1 acres. The 6-foot mower cut an average of one acre more per day than the 5-foot machine. All but 3 of the farms had hay loaders. These three spent an average of 6.8 hours of man labor per ton at harvest work other than cutting. All others with hay loaders (excluding the few who used tractors) used only 4.3 man hours per ton after cutting. There were hardly sufficient records of hay making without the loader for making a definite comparison but the figures presented indicate the economy of the loader.

The importance of yield.—To show the relationship of yield per acre and cost per ton the records were divided into two groups. Those with less than 1.75 tons per acre and an average of 1.4 tons produced hay at a cost of $12.13 a ton; while those whose yields were more than 1.75 per acre (averaging 2.08 tons) had a cost of only $8.42 a ton.

TIMOTHY HAY

Variations in costs.—Table 35 shows the cost of producing timothy hay varied from $7.28 to $18.03 per ton, the average being $10.01. Labor per ton varied from 3.2 man hours and 3.4 horse hours on Farm 14 to 9.5 man hours and 9.6 horse hours on Farm 8. The side-delivery rake showed up to decided advantage as a labor-saving piece of equipment. To make the farms comparable, those who used tractors in loading hay were omitted from the calculation. On 5 farms having side-delivery rakes an average of 3.4 hours of man labor per ton was used in harvesting work other than cutting; while the other 11 farms without this tool spent 5.2 hours per ton.

Comparison of mixed hay with timothy.—Some of the reasons why timothy is included in the rotation in this area were presented in a previous section of the bulletin. Another reason is shown in Tables 34 and 35, the cost per ton being only a few cents higher in the case of timothy. Mixed hay required more man labor, horse work, and equipment per acre than timothy hay but when these costs are reduced to a ton basis they are identical for the two kinds of hay. Seed, especially when high in price, is a considerable item in the cost of producing mixed hay. Another difference in the two crops lies in the amount of pasture credit. There is very little aftermath in a timothy meadow; first-year clover meadows were pastured to a larger extent after hay making and on 10 per cent of the total area a second crop of clover was cut, yielding about two-thirds of a ton per acre. In computing the costs of producing a ton of mixed hay the labor on the second cutting was not included. The yield of the second cutting, when made, was credited to the hay account at a value per ton equal to one-half the market price of hay, this representing approximately the value of the crop standing in the field.

SUMMARY

The cost of growing corn up to harvest on the different farms ranged from 54 cents to $1.16 a bushel.

The total cost of labor and power comprised 38.6 per cent of the cost of growing corn up to harvest.

The two operations of plowing and cultivating used approximately 60 per cent of the labor employed on corn up to harvest.

The use of a tractor to the extent of 3.6 hours an acre was accompanied by a saving of 30 per cent of the man labor and 60 per cent of the horse work on corn up to harvest.

Large fields were an effective means of reducing the labor requirements on corn. A given area of corn grown in fields of 15 acres or more required one-third less man labor up to harvest than the same area grown in fields smaller than 5 acres in size.

On farms averaging 31 bushels of corn per acre the cost up to harvest time was 93 cents a bushel as compared to 69 cents a bushel on farms making an average of 50 bushels an acre.

Corn planted before May 20 made a 61 per cent larger yield than plantings delayed until three weeks later.

In the operation of cutting and shocking corn, a corn binder and 2 or 3 horses increased the work accomplished per hour of man labor 85 per cent.

Husking a given amount of corn with a shredder required only half as much man labor as husking it by hand and hauling in the stover.

More than two-thirds of all the labor on corn was used in harvesting.

Of the total cost of producing and harvesting corn for grain, man labor formed 30.4 per cent, horse and tractor work 24.2 per

cent, equipment 7.1 per cent, manure and fertilizer 19.0 per cent, seed 0.8 per cent, interest on land 11.7 per cent, and other items 6.8 per cent.

Less than half as much man labor was spent in harvesting an acre of silage as was spent on an equal area of corn harvested for grain.

Silo-filling crews composed of less than 12 men and 10 horses were 25 per cent more efficient than larger crews.

The cost of producing oats on the different farms ranged from 36 cents to 88 cents a bushel.

In preparing the seed bed for oats, farmers who did part of the work with tractors (to the extent of 2.2 hours per acre) used only 60 per cent as much man labor per acre and less than one-fourth as much horse work as those using horses alone.

A given quantity of oats produced on a plowed seed bed cost 25 per cent more than if produced on a disked seed bed.

Oats sown before the last week in April produced 50 per cent more per acre than oats seeded after the first week in May.

Stacking and stack-threshing of oats required 50 per cent more man labor than shock-threshing.

The cost of producing wheat on the different farms ranged from 98 cents to $2.33 a bushel.

In preparing the seed bed for wheat, farmers who did part of the work with tractors (to the extent of 3 hours per acre) used only one-half as much man labor and about one-sixth as much horse work as those using horses alone.

Having wheat follow corn and sowing the wheat on a disked seed bed was not an economical practice even tho it afforded a considerable saving of labor. Wheat grown on a plowed seed bed (following oats) made a 5 bushel an acre higher yield and was produced at 20 cents less per bushel.

Wheat sown later than October 10 made 6 bushels an acre less than that seeded the last ten days of September.

The cost of producing mixed clover and timothy hay ranged from $6.26 to $16.25 per ton.

The cost of producing timothy hay ranged from $7.28 to $18.03 per ton.

The hay loader and side-delivery rake were effective tools in reducing the labor on hay.

APPENDIX

METHODS USED IN COMPUTING COSTS

Man labor.—The rate per hour of man labor was obtained for each farm by first calculating the total cost of hired labor, which included all things furnished to hired labor such as board and room, or use of tenant house, and meat, milk, potatoes, fuel, etc., as well as cash wages. To this was added the value of the operator's labor, estimated at 30 cents per hour. The resulting total was then divided by the total hours of labor performed by hired labor and farm operator combined. The man-labor rate averaged 27.2 cents and ranged from 21.4 to 31.0 cents per hour.

Horse work.—A separate horse-work rate was computed for each farm. The cost per horse-hour was obtained by dividing the total cost of keeping all the horses on a particular farm which included feed, bedding, use of stable, harness and other horse equipment, interest, taxes, insurance on and depreciation of horses, shoeing, veterinarian, etc., by the total number of hours of horse work done on that farm. The average cost per hour of horse work for the 5 years was 20.6 cents, the range being from 13.3 to 37.7 cents per horse hour. This high average cost per hour is explained largely by the fact that considerable quantities of corn, oats, and hay, higher priced in northeastern Ohio than in the western half of the State, were consumed per horse. Total cost of feed averaged $103 annually per horse, total cost of keeping a horse averaged $160 per year, and the horses worked an average of 778 hours annually per horse.

Equipment charges.—Equipment charges include labor of repairing, cash repairs, fuel and lubricants, use of buildings for shelter, depreciation of equipment, interest, taxes, and insurance. The total annual cost of horse-drawn equipment on each farm was distributed to the different enterprises in proportion to the number of hours of horse work spent on them. The rate per horse hour averaged 6.4 cents and varied from 1.9 to 13.9 cents, a factor influenced largely by the age and extent of the equipment found on the different farms. Tractor operating costs were distributed according to the number of hours of work done by each tractor.

Manure charges.—Manure was credited to livestock on the farm at the rate of one dollar per load or per ton at the barn and charged to crops at the same rate plus the cost of hauling and spreading. The average cost of hauling and spreading one load, which included a charge for the use of the spreader, 1.05 hours of man labor and 1.76 hours of horse work, was 76 cents. Of the total amount of manure applied to a given field in a given season 50 per cent was charged to the first crop following the application, 30 per cent to the second crop and 20 per cent to the third crop.

Other cost factors.—Commercial fertilizers, purchased seeds, twine, coal or other fuel, and machine charges for threshing, silo filling, and corn shredding, were charged to crops at cost. Home-grown seed was valued at market prices of seed of like quality.

Taxes as they appear in the tables in this bulletin are the bare land's proportionate share of the real estate taxes. General property taxes on horses and equipment and a part of the real estate taxes that enter into the annual building charges on a given farm are included in the horse-labor cost and equipment charges.

Overhead includes only those items of expense that are so general that they cannot be charged directly to the various farm enterprises. Among these items are interest and taxes on land in roads, lanes and farmstead, labor and other expense connected with the maintenance of fences, lanes and barnyards, weed control along fences and roadways, and such cash expenses as telephone rent, subscriptions to farm journals, and farm organization dues. The total overhead charge on each farm was prorated to the livestock and crop enterprises in proportion to the gross value of the product of each enterprise.

Interest at 5 per cent of the estimated value of the land is shown herein as a separate item. As an item of cost it is subject to considerable difference of opinion, and so may be included or excluded according to the wishes of the reader. Interest on horses and equipment and a part of the interest on buildings are included as a part of the horse-work and equipment charges.

Storage charges not included.—The cost of producing the various crops are figured up to and including the time of putting them into farm storage. Costs of maintaining corn cribs, silos, granaries, and hay mows are not included.

In the following tables are shown average amounts of labor by operations and detailed farm-to-farm variations in the cost of producing the various crops.

TABLE 24.—Corn for Grain: Variations in Cost of Growing up to Harvest, 1920-1923

Farm	Cost per acre																	Yield per acre	Cost per bushel
	Man labor		Horse work		Use of tractor		Equipment charge	Manure charge		Fertilizer applied		Seed		Overhead charge	Taxes on land	Interest on land	Total		
	Amt.	Value	Amt.	Cost	Amt.	Cost		Amt.	Value	Amt.	Cost	Amt.	Cost						
	Hr.	*Dol.*	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Dol.*	*T.*	*Dol.*	*Lb.*	*Dol.*	*Lb.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Bu.*	*Dol.*
17	18.9	5.88	33.6	5.21	...	...	1.73	1.3	2.46	301	1.91	12.7	0.76	1.17	0.76	4.62	24.50	45.1	.54
23	16.2	4.85	37.6	5.00	...	...	3.00	5.2	8.26	108	1.48	7.3	.15	2.57	2.47	6.60	34.38	59.1	.58
21	15.5	4.73	29.7	6.23	...	...	1.63	...	...	443	7.43	9.7	.51	.75	1.22	6.00	28.50	47.8	.60
18	9.7	2.88	14.1	3.02	3.2	5.94	3.30	1.7	3.05	190	2.67	13.7	.54	1.91	1.09	5.09	29.49	46.7	.63
1	15.1	4.17	22.6	4.77	2.8	2.95	1.79	4.6	8.17	280	3.04	10.7	.46	1.88	1.45	6.60	35.28	53.9	.65
10	11.8	3.22	13.0	2.65	3.8	4.49	2.03	5.1	8.27	267	2.84	9.7	.35	2.43	1.07	6.62	33.97	47.6	.71
6	13.9	4.19	32.8	6.84	...	...	2.03	2.0	3.48	255	3.02	11.4	.35	.90	.60	5.10	26.51	36.9	.72
2	21.2	5.24	42.1	8.46	...	...	2.02	7.6	12.48	96	1.21	9.1	.48	1.70	1.15	6.30	39.04	53.8	.73
11	20.6	4.42	21.3	3.86	3.6	3.42	2.39	2.4	3.74	130	1.43	13.3	.41	1.73	.91	4.56	26.87	36.5	.74
16	14.1	4.12	28.4	4.71	5 0	4.29	2.50	...	...	129	1.67	13.3	.27	1.71	1.15	4.80	25.22	34.1	.74
5	17.8	5.32	36.3	7.32	...	...	1.55	4.5	7.72	157	2.30	9.2	.29	1.94	.85	4.80	32.09	42.0	.76
3	21.8	5.65	45.8	7.64	...	...	2.25	6.3	11.40	153	1.69	8.2	.38	2.17	.95	5.10	37.23	48.6	.77
15	13.4	3.93	28.9	6.25	...	...	1.56	4.2	7.61	123	1.46	10.1	.56	3.19	.87	4.84	30.27	37.6	.80
9	17.0	4.99	41.2	6.11	.6	.57	1.46	4.3	7.22	43	.47	8.0	.16	1.48	1.84	5.10	29.40	36.0	.82
13	7.8	2.23	8.5	1.65	3.2	6.07	1.59	3.5	5.48	129	1.63	7.6	.20	3.02	1.05	4.58	27.50	33.3	.83
12	10.8	3.20	15.5	5.85	3.0	3.16	2.45	3.6	5.45	175	2.14	11.7	.40	1.57	1.18	4.19	29.59	35.3	.84
8	18.5	4.27	40.0	7.37	...	...	1.88	1.4	2.46	225	3.53	8.8	.36	1.48	.81	5.68	27.84	29.6	.94
14	14.3	4.30	24.3	6.69	1.4	2.06	2.57	2.9	5.74	219	2.53	9.5	.45	1.60	.85	6.60	33.39	35.3	.95
19	17.6	4.75	38.3	11.85	...	...	1.82	4.4	9.00	307	4.28	9.2	.45	.79	.55	4.20	37.69	39.6	.95
22	20.9	5.73	48.2	8.78	...	...	2.48	3.4	6.30	234	2.94	9.5	.47	2.75	.91	5.70	36.06	36.7	.98
4	16.6	4.20	35.5	8.16	1.9	1.40	3.35	1.4	2.79	159	3.00	9.7	.43	1.90	1.01	4.80	31.04	29.8	1.04
7	22.2	6.59	44.2	6.09	...	...	.83	4.6	7.72	258	3.25	9.1	.37	1.46	.70	5.66	32.67	31.2	1.05
20	15.4	4.49	37.5	9.78	...	...	2.50	3.7	6.79	98	1.18	9.8	.43	1.12	.85	4.80	31.94	27.5	1.16
Tractor farms	12.4	3.45	16.2	3.80	3.6	4.19	2.09	3.1	5.50	209	2.68	10.8	.43	2.01	1.16	5.65	30.96	42.4	.73
Horse farms	18.3	5.06	39.4	7.78	.1*	.07	2.05	3.9	6.86	189	2.43	9.3	.37	1.73	1.07	5.36	32.78	40.6	.81
All farms	16.2	4.50	31.2	6.38	1.3	1.52	2.07	3.7	6.38	196	2.52	9.8	.39	1.82	1.10	5.46	32.14	41.2	.78

*Some tractor work was hired for plowing a few acres on Farm 9.

TABLE 25.—All Corn up to Harvest: Labor, per Acre Once Over and Total, by Operations, Averages of All Farms Owning and All Not Owning Tractors, 1920-1923

Operation	Farms owning tractors							Farms not owning tractors						
	Times over	Labor per acre						Times over	Labor per acre					
		Once over			Total				Once over			Total		
		Man	Horse	Tractor	Man	Horse	Tractor		Man	Horse	Tractor	Man	Horse	Tractor
		Hr.	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*		*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*
Plowing with tractor	.88	2.13	....	2.13	1.88	....	1.88	.03	2.09	....	2.09	.06	....	.06
Plowing with horses	.12	.53	1.14	....	.63	1.33	....	.97	5.69	13.76	....	5.53	13.35	....
Disking with tractor	1.26	.60	....	.60	.76	....	.76	.01	.70	....	.70	.01	....	.01
Disking with horses	.08	.86	2.85	....	.07	.23	....	.89	.98	2.92	....	.87	2.60	....
Spring-toothing with tractor	.43	.46	....	.46	.20	....	.20	....	....	....	....	....	....	....
Spring-toothing with horses	.25	.76	2.10	....	.19	.53	....	1.73	1.02	2.83	....	1.77	4.90	....
Rolling with horses	.12	1.04	2.08	....	.12	.24	....	.97	.84	1.73	....	.82	1.69	....
Cultipacking with tractor	.12	.52	....	.52	.06	....	.06	....	....	....	....	....	....	....
Cultipacking with horses	.62	.72	1.78	....	.45	1.10	....	.27	.83	1.99	....	.22	.53	....
Spike-tooth harrowing	.21	.61	1.39	....	.13	.29	....	.81	.75	1.94	....	.61	1.58	....
Two tools together	1.05	.56	....	.56	.59	....	.59	....	....	....	....	....	....	....
Drilling fertilizer	.52	.83	1.72	....	.43	.89	....	.36	1.08	2.03	....	.39	.74	....
Planting corn	1.00	.79	1.59	....	.79	1.59	....	1.00	.99	1.93	....	.99	1.93	....
Prepare soil for replanting	.24	.64	.32	.48	.15	.08	.11	.01	1.00	2.00	....	.01	.02	....
Replanting with horses	.15	.73	1.46	....	.11	.22	....	.01	.90	1.80	....	.01	.02	....
Replanting by hand	....	....	....	....	.62	....	....	....	....	....	....	.15	....	....
Harrowing after planting	.85	.70	1.28	....	.60	1.09	....	1.18	.77	1.60	....	.91	1.89	....
Cultivating	3.32	1.25	2.46	....	4.17	8.17	....	3.22	1.55	3.02	....	4.99	9.71	....
Hand hoeing	....	....	....	....	.51	....	....	....	....	....	....	.60	....	....
Grand total	....	....	....	....	12.46	15.76	3.60	....	....	....	....	17.94	38.96	.07*

*Hired tractor work.

TABLE 26.—Corn: Variations in Cost of Cutting and Shocking by Hand, 1920-1923

Farm	Cost per acre				
	Man labor		Twine		Total
	Amount	Value	Amount	Cost	
	Hr.	*Dol.*	*Lb.*	*Dol.*	*Dol.*
4	8.7	2.22	0.4	0.05	2.27
19	9.2	2.47	.4	.05	2.52
5	8.4	2.53	.4	.05	2.58
2	10.4	2.59	.4	.05	2.64
6	9.2	2.77	.3	.03	2.80
22	10.2	2.77	.4	.06	2.83
11	13.1	2.80	.6	.07	2.87
1	10.4	2.88	.5	.07	2.95
12	10.0	2.97	.2	.02	2.99
7	9.2	2.96	.6	.08	3.04
16	10.3	3.03	.5	.05	3.08
17	10.0	3.11	.5	.05	3.16
15	11.0	3.25	.5	.07	3.32
9	11.3	3.34	.5	.05	3.39
10	12.3	3.36	.6	.07	3.43
20	12.1	3.69	.6	.10	3.79
8	17.6	4.07	.4	.05	4.12
3	17.0	4.40	.4	.05	4.45
Average	10.7	2.97	.5	.06	3.03

TABLE 27.—Corn: Variations in Cost of Cutting With Binder and Shocking by Hand, 1920-1923

Farm	Amounts per acre						Cost per acre				
	Labor					Twine	Man labor	Horse work	Equipment	Twine	Total
	Cutting		Shocking	Total							
	Man	Horse	Man	Man	Horse						
No.	Hr.	Hr.	Hr.	Hr.	Hr.	Lb.	Dol.	Dol.	Dol.	Dol.	Dol.
9	1.8	4.6	4.1	5.9	4.6	2.3	1.73	.68	.48	.25	3.14
6	1.3	3.8	3.6	4.9	3.8	2.0	1.49	.79	.80	.20	3.28
15	1.7	4.1	2.4	4.1	4.1	2.4	1.21	.88	.91	.31	3.31
14	1.4	3.1	3.2	4.6	3.1	3.2	1.38	.84	.71	.45	3.38
11	1.8	3.6	4.2	6.0	3.6	2.4	1.29	.66	1.20	.27	3.42
12	1.5	3.0	2.9	4.4	3.0	1.7	1.31	1.16	.79	.19	3.45
1	1.6	3.7	4.6	6.2	3.7	3.6	1.71	.79	.55	.46	3.51
8	2.3	4.5	3.9	6.2	4.5	2.3	1.44	.82	.93	.34	3.53
10	1.5	3.0	3.0	4.5	3.0	2.7	1.23	.61	1.44	.34	3.62
17	2.0	4.0	4.4	6.4	4.0	2.2	2.00	.63	.77	.24	3.64
4	2.1	5.0	3.8	5.9	5.0	2.7	1.51	1.15	.64	.35	3.65
2	1.8	3.7	6.1	7.9	3.7	2.7	1.97	.75	.63	.32	3.67
13	1.8	5.2	4.8	6.6	5.2	3.5	1.87	1.00	.52	.40	3.79
3	1.9	3.8	7.2	9.1	3.8	2.3	2.37	.64	.62	.31	3.94
22	1.9	5.0	4.9	6.8	5.0	2.5	1.87	.91	.80	.37	3.95
23	1.5	4.6	3.2	4.7	4.6	3.5	1.41	.61	1.59	.42	4.03
18	1.7	5.1	4.2	5.9	5.1	3.0	1.77	1.10	1.04	.35	4.26
19	2.2	5.3	4.5	6.7	5.3	2.1	1.80	1.65	1.09	.32	4.86
Average	1.7	4.2	4.1	5.8	4.2	2.9	1.61	.91	.80	.36	3.68

Table 28.—Corn for Silage: Variations in Cost of Growing up to Harvest, 1920-1923

Farm	Cost per acre																	Yield per acre	Cost per ton
	Man labor		Horse work		Use of tractor		Equip-ment charge	Manure charges		Fertilizer applied		Seed		Over-head charge	Taxes on land	Interest on land	Total		
	Amt.	Value	Amt.	Cost	Amt.	Cost		Amt.	Value	Amt.	Cost	Amt.	Cost						
	Hr.	*Dol.*	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Dol.*	*T.*	*Dol.*	*Lb.*	*Dol.*	*Lb.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*T.*	*Dol.*
8	14.4	3.32	34.7	6.40	....	......	1.63	.7	1.30	224	3.60	12.9	.77	1.48	.82	5.68	25.00	6.76	3.70
11	20.8	4.46	17.9	3.24	2.7	2.62	1.97	5.8	9.16	81	.68	10.7	.48	1.73	.91	4.56	29.81	7.88	3.78
13	8.0	2.29	10.3	1.98	2.9	5.43	1.60	3.6	5.76	146	1.55	11.7	.54	3.02	1.05	4.58	27.80	7.33	3.80
15	12.1	3.58	26.1	5.64	....	.....	1.40	2.6	4.73	136	1.58	12.0	.79	3.19	.87	4.84	26.62	6.99	3.81
17	24.5	7.60	37.9	5.89	....	.....	1.96	2.1	3.98	472	2.84	14.2	.82	1.17	.90	5.10	30.26	7.91	3.83
6	14.2	4.26	33.3	6.96	....	.....	2.06	2.7	4.78	266	3.27	13.4	.75	.90	.60	5.10	28.68	6.85	4.19
12	10.6	3.14	14.9	5.63	2.9	3.00	2.34	3.0	4.60	172	2.12	13.4	.72	1.58	1.18	4.19	28.50	6.65	4.29
1	15.7	4.37	25.3	5.32	2.6	2.65	1.93	6.3	11.02	225	2.45	13.3	.57	1.88	1.45	6.60	38.24	8.68	4.41
5	19.3	5.77	36.7	7.41	....	......	1.57	2.3	4.04	181	1.77	12.8	.59	1.94	.85	4.80	28.74	6.48	4.44
10	11.8	3.24	13.2	2.67	3.9	4.62	2.07	5.2	8.32	314	3.57	13.7	.91	2.43	1.07	6.63	35.53	7.81	4.55
22	23.3	6.36	47.2	8.59	....	.....	2.43	7.9	14.79	227	2.94	14.8	1.11	2.75	.91	5.70	45.58	9.70	4.70
3	24.2	6.28	48.3	8.06	....	......	2.37	6.9	12.57	98	1.08	10.5	.55	2.17	.95	5.10	39.13	7.97	4.91
14	13.9	4.17	23.9	6.58	1.7	2.46	2.60	3.1	6.16	247	3.45	10.7	.65	1.60	.85	6.60	35.12	6.88	5.11
9	17.5	5.14	39.5	5.87	.4	.45	1.39	2.6	4.29	33	.35	8.6	.18	1.48	1.84	5.10	26.09	5.02	5.20
18	11.9	3.53	16.1	3.44	4.2	7.83	4.01	5.4	9.95	268	3.08	16.5	1.03	1.91	1.09	5.29	41.16	7.88	5.22
7	20.8	6.15	41.2	5.67	....	......	.77	6.2	10.34	289	3.79	16.4	.94	1.46	.70	5.66	35.48	6.80	5.22
4	16.5	4.18	32.7	7.50	2.9	2.18	3.20	2.2	4.43	184	3.80	15.9	1.09	1.91	1.01	4.80	34.10	5.85	5.83
20	13.0	3.79	30.5	7.95	.7	.65	2.10	6.2	11.43	122	1.50	10.7	.77	1.12	.84	4.80	34.95	5.80	6.02
2	20.1	4.99	44.5	8.93	....	.....	2.14	5.3	8.67	121	1.58	11.2	.73	1.70	1.15	6.30	36.19	4.74	7.63
Tractor farms	12.5	3.41	15.3	3.61	3.6	4.38	2.07	4.0	7.11	223	2.89	13.6	.79	2.10	1.20	5.79	33.35	7.49	4.45
Horse farms	17.6	4.76	38.5	7.56	.1*	.07	2.09	3.9	6.85	177	2.29	12.1	.70	1.75	.91	5.33	32.31	6.57	4.92
All farms	15.9	4.32	30.8	6.25	1.3	1.50	2.08	3.9	6.94	192	2.49	12.6	.73	1.87	1.00	5.48	32.66	6.88	4.75

*Includes tractor work hired for small jobs of plowing on Farms 9 and 20.

TABLE 29.—Corn Silage: Variations in Cost of Harvesting, 1920-1923

Farm	Amounts per acre: Labor: Cutting corn: With binder: Man	With binder: Horse	By hand: Man	Average: Man	Average: Horse	Hauling corn, filling silo: Man	Hauling corn, filling silo: Horse	Total: Man	Total: Horse	Twine	Silo filling labor per ton: Man	Silo filling labor per ton: Horse	Cost per acre: Man labor	Horse work	Equipment	Twine	Fuel, power, and cutter	Total	Yield per acre	Cost per ton
No.	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Lb.*	*Hr.*	*Hr.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Tons*	*Dol.*
22........	2.1	6.4	12.5	2.4	6.3	15.5	11.3	17.9	17.6	3.7	1.6	1.2	4.90	3.20	1.00	.53	4.57	14.20	9.70	1.46
1........	1.8	3.7	10.6	2.1	3.6	17.3	11.8	19.4	15.4	3.7	2.0	1.4	5.38	3.23	.80	.51	3.31	13.23	8.68	1.52
10........	1.5	3.1	12.7	1.5	3.0	11.5	9.0	13.0	12.0	3.5	1.5	1.2	3.56	3.01	1.73	.47	3.33	12.10	7.81	1.55
15........	1.6	4.5	12.1	2.2	4.3	10.5	8.4	12.7	12.7	2.7	1.5	1.2	3.75	2.75	1.01	.36	3.37	11.24	6.99	1.61
14........	1.4	3.4	11.6	1.9	3.3	10.6	9.7	12.5	13.0	3.2	1.5	1.4	3.77	3.57	.85	.44	3.12	11.75	6.88	1.71
8........	1.8	5.4	9.9	3.9	4.0	12.4	10.1	16.3	14.1	2.2	1.8	1.5	3.77	2.60	.86	.30	4.18	11.71	6.76	1.73
11........	1.8	4.3	13.0	3.8	3.5	16.5	12.4	20.3	15.9	3.5	2.1	1.6	4.34	2.88	1.36	.38	5.55	14.51	7.88	1.84
2........	1.5	3.6	12.0	1.9	3.6	9.0	7.2	10.9	10.8	2.5	1.9	1.5	2.70	2.16	.72	.34	3.15	9.07	4.74	1.91
17........	2.2	6.6	15.0	2.4	6.4	19.8	15.1	22.2	21.5	2.7	2.5	1.9	6.88	3.34	1.01	.29	4.63	16.15	7.91	2.04
13........	1.9	5.6	14.2	2.9	5.1	16.9	13.0	19.8	18.1	3.2	2.3	1.8	5.66	3.48	.77	.37	5.30	15.58	7.33	2.13
6........	1.4	3.8	10.6	2.0	3.5	16.0	13.5	18.0	17.0	3.5	2.3	2.0	5.41	3.56	1.03	.44	4.18	14.62	6.85	2.13
5........	1.9	4.2	10.0	2.2	4.0	13.6	11.2	15.8	15.2	4.0	2.1	1.7	4.73	3.07	.93	.47	4.69	13.89	6.48	2.14
18........	1.9	5.8	....	1.9	5.8	14.6	10.9	16.5	16.7	3.9	1.9	1.4	4.92	3.58	1.54	.45	6.54	17.03	7.88	2.16
9........	2.0	4.7	11.3	2.6	4.4	13.0	10.6	15.6	15.0	2.0	2.6	2.1	4.60	2.23	.57	.25	3.32	10.97	5.02	2.19
3	2.1	4.2	18.4	3.6	3.8	25.9	18.8	29.5	22.6	3.4	3.2	2.4	7.64	3.76	.87	.42	5.49	18.18	7.97	2.28
7........	1.6	4.2	10.0	2.1	4.0	15.0	12.2	17.1	16.2	4.2	2.2	1.8	5.05	2.23	.98	.53	6.76	15.55	6.80	2.29
12..	2.2	5.2	9.3	3.4	4.7	12.6	11.6	16.0	16.3	2.9	1.9	1.7	4.73	6.17	1.04	.33	4.20	16.47	6.65	2.48
4........	2.1	5.4	12.4	2.9	5.0	12.6	13.4	15.5	18.4	3.1	2.1	2.3	3.94	4.22	.98	.42	5.17	14.73	5.85	2.52
20........	1.6	4.6	12.5	1.9	4.6	13.7	12.8	15.6	17.4	3.4	2.4	2.2	4.76	4.53	.97	.49	4.64	15.39	5.80	2.65
Average.	1.8	4.5	11.9	2.6	4.1	14.1	11.4	16.7	15.5	3.1	2.1	1.7	4.56	3.32	.96	.40	4.23	13.47	6.88	1.96

TABLE 30.—Oats: Variations in Cost of Production, 1920-1924

Farm	Cost per acre										
	Man labor		Horse work		Use of tractor		Equipment charge	Manure charge		Fertilizer applied	
	Amount	Value	Amount	Cost	Amount	Cost		Amount	Value	Amount	Cost
No.	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Dol.*	*Ton*	*Dol.*	*Lb.*	*Dol.*
17	15.9	4.94	25.7	3.98	....	....	1.33	1.0	1.99	255	1.66
23	14.3	4.29	25.4	3.38	....	....	2.03	1.5	2.34	93	1.40
16	9.4	2.76	5.2	1.32	2.4	2.04	1.05	.2	.31	157	1.58
21	14.1	4.30	16.8	3.51	....	....	.92	1.3	2.17	328	4.21
18	10.2	3.02	8.3	1.77	.9	1.76	1.55	2.4	4.42	138	1.47
6	11.4	3.42	21.4	4.48	....	....	1.33	1.5	2.64	134	1.55
1	15.0	4.17	13.5	2.85	2.1	2.19	1.11	2.9	5.18	154	1.69
9	10.6	3.11	18.0	2.66	.1	.14	.62	.4	.71	88	.89
15	12.8	3.76	21.8	4.72	....	....	1.17	1.4	2.58	151	1.76
10	11.4	3.12	5.5	1.12	3.2	3.83	1.11	3.2	5.19	180	1.90
5	13.6	4.09	19.5	3.93	.3	.26	.84	2.8	4.74	118	1.23
14	11.4	3.44	17.7	4.87	.6	.82	1.75	1.4	2.73	127	1.25
11	17.4	3.71	16.9	3.06	2.2	2.12	1.81	2.9	4.63	92	.85
4	12.9	3.28	18.7	4.31	2.0	1.51	1.87	1.0	2.07	127	2.23
8	17.5	4.06	30.9	5.70	....	....	1.46	2.1	3.71	103	1.25
2	15.3	3.79	24.9	5.00	.6	.56	1.37	2.4	4.13	126	1.52
12	10.1	3.00	9.4	3.57	2.7	2.81	1.67	2.4	3.62	70	1.04
7	19.7	5.83	30.2	4.15	....	....	.56	3.0	5.02	181	2.23
3	18.8	4.88	26.7	4.46	....	....	1.31	3.8	6.84	91	1.10
19	11.7	3.14	16.5	5.11	....	....	.79	2.2	4.42	295	3.75
22	21.7	5.95	39.0	7.09	....	....	2.01	2.3	4.34	271	3.39
20	15.2	4.45	25.5	6.67	....	....	1.71	5.2	9.48	150	1.91
Tractor farms	12.0	3.29	10.4	2.51	2.5	2.51	1.32	2.1	3.77	139	1.64
Horse farms	15.0	4.10	25.2	4.96	†	.03	1.37	2.0	3.54	145	1.71
All farms	13.8	3.77	19.2	3.96	1.0	1.04	1.35	2.1	3.63	143	1.68

TABLE 30.—Oats: Variations in Cost of Production, 1920-1924—Continued

Cost per acre										
Seed		Twine, fuel, threshing	Overhead charge	Taxes on land	Interest on land	Total	Straw credit*	Net cost	Yield per acre	Cost per bushel
Amount	Cost									
Bu.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Bu.*	*Dol.*
2.7	1.44	2.61	.71	.89	5.10	24.65	5.51	19.14	53.2	.36
2.7	1.28	2.97	1.26	2.47	6.60	28.02	5.93	22.09	59.3	.37
2.8	1.37	1.93	.87	1.16	4.80	19.19	3.40	15.79	37.5	.42
2.6	2.18	3.64	.60	1.22	6.00	28.75	5.24	23.51	51.3	.46
2.5	1.25	1.60	1.04	1.08	5.36	24.32	4.04	20.28	40.9	.50
2.6	1.70	2.38	.60	.61	5.10	23.81	3.93	19.88	39.6	.50
2.4	1.47	2.66	1.20	1.58	6.60	30.70	5.22	25.48	48.3	.53
2.3	1.11	1.78	.80	1.77	5.09	18.68	2.89	15.79	29.8	.53
2.5	1.76	2.46	2.22	.88	4.84	26.15	4.04	22.11	41.1	.54
2.3	1.53	2.47	1.38	1.15	6.74	29.54	4.92	24.62	44.6	.55
2.0	1.24	2.16	1.15	.91	4.80	25.35	3.76	21.59	37.8	.57
2.5	1.97	2.33	.98	.85	6.42	27.41	3.75	23.66	38.8	.61
2.3	1.20	1.74	1.08	.87	4.49	25.56	3.40	22.16	35.7	.62
2.5	1.60	2.18	1.14	1.01	4.80	26.00	3.26	22.74	34.0	.67
2.8	2.19	2.16	.89	.77	6.00	28.19	3.56	24.63	36.0	.69
2.7	1.89	2.12	1.03	1.01	5.59	28.01	3.65	24.36	34.8	.70
2.7	2.18	1.78	.69	1.25	4.20	25.81	2.93	22.88	32.1	.71
2.8	1.64	2.01	.63	.72	5.66	28.45	3.67	24.78	33.8	.73
2.3	2.12	2.36	1.00	1.07	5.10	30.24	3.65	26.59	34.0	.78
2.5	2.39	2.16	.79	.53	4.20	27.28	2.64	24.64	28.5	.86
2.6	2.43	2.63	1.70	.92	5.70	36.16	3.71	32.45	37.5	.87
2.4	2.61	3.16	.92	.83	4.80	36.54	3.55	32.99	37.5	.88
2.6	1.77	2.38	1.01	1.21	5.58	26.99	4.12	22.87	40.6	.56
2.5	1.70	2.20	1.08	.97	5.38	27.04	3.72	23.32	37.1	.63
2.5	1.72	2.29	1.05	1.07	5.46	27.02	3.91	23.11	38.8	.60

*Straw valued at $5.00 per ton.
†A small amount of tractor work hired on Farms 9 and 5.

TABLE 31.—Oats: Labor, per Acre Once Over and Total by Operations, Averages of All Farms Owning and All Not Owning Tractors, 1920-1924

Operation	Farms owning tractors							Farms not owning tractors						
	Times over	Labor per acre						Times over	Labor per acre					
		Once over			Total				Once over			Total		
		Man	Horse	Tractor	Man	Horse	Tractor		Man	Horse	Tractor	Man	Horse	Tractor
		Hr.	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*
Plowing with tractor	.62	2.00	......	2.00	1.26	......	1.26	......	......	......	......	......	......	......
Plowing with horses	.20	5.36	11.00	......	1.09	2.22	......	.85	4.81	11.81	......	4.10	10.05	......
Disking with tractor	.23	.68	......	.68	.16	......	.16	......	......	......	......	......	......	......
Disking with horses	.02	1.29	2.58	......	.02	.04	......	.27	1.04	2.98	......	.28	.82	......
Spring-toothing with tractor	.44	.53	......	.53	.23	......	.23	......	......	......	......	......	......	......
Spring-toothing with horses	.26	.76	2.03	......	.20	.53	......	.66	.98	2.79	......	.65	1.85	......
Rolling with horses	.01	.83	1.66	......	.01	.02	......	.45	.86	1.78	......	.39	.80	......
Cultipacking with tractor	.07	.51	......	.51	.04	......	.04	......	......	......	......	......	......	......
Cultipacking with horses	.25	.73	1.60	......	.18	.40	......	.17	.79	1.58	......	.13	.26	......
Spike-tooth harrowing	.22	.69	1.44	......	.15	.31	......	1.02	.71	1.83	......	.72	1.87	......
Two tools together	.88	.58	......	.58	.50	......	.50	.02	.53	......	.53	.01	......	.01
Total seed-bed preparation	3.20	......	......	......	3.84	3.52	2.19	3.44	......	......	......	6.28	15.65	.01
Drilling	1.00	.97	2.00	......	.97	2.00	......	1.00	1.05	2.11	......	1.05	2.11	......
Cutting with tractor	.41	1.40	......	.70	.58	......	.29	.03	1.34	......	.67	.04	......	.02
Cutting with horses	.59	1.02	2.73	......	.60	1.60	......	.97	1.14	3.56	......	1.11	3.49	......
Shocking	1.00	1.46	......	......	1.46	......	......	1.00	1.69	......	......	1.69	......	......
Reshocking	......	.08	......	......	.08	......	......	......	.17	......	......	.17	......	......
Shock-threshing	.71	3.90	3.42	......	2.78	2.44	......	.86	4.35	3.83	......	3.73	3.29	......
Hauling and stacking	.29	3.08	3.02	......	.88	.86	......	.14	3.86	4.64	......	.54	.65	......
Stack-threshing	.29	2.92	.09	......	.84	.03	......	.14	2.76	.20	......	.39	.03	......
Grand total	......	......	......	......	12.03	10.45	2.48	......	......	......	......	15.00	25.22	.03

TABLE 32.—Wheat: Variations in Cost of Production, 1921-1924

Farm	Cost per acre										
	Man labor		Horse work		Use of tractor		Equipment charge	Manure charge		Fertilizer applied	
	Amount	Value	Amount	Cost	Amount	Cost		Amount	Value	Amount	Cost
No.	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Dol.*	*Ton*	*Dol.*	*Lb.*	*Dol.*
11	21.0	4.48	26.4	4.76	1.9	1.81	2.60	3.5	5.51	357	4.24
16	14.8	4.34	9.3	2.37	4.1	3.45	1.66	.1	.13	250	2.86
18	12.4	3.67	9.5	2.04	3.3	6.16	2.70	1.9	3.46	323	3.85
1	19.4	5.38	19.3	4.06	4.2	4.34	1.70	1.7	3.06	306	3.78
13	7.4	2.11	7.5	1.45	1.0	1.92	.83	2.7	4.29	263	2.87
5	14.2	4.25	20.9	4.22	.2	.16	.90	2.1	3.63	287	3.70
12	9.4	2.79	5.8	2.19	3.9	4.07	1.51	1.9	2.82	260	2.90
2	25.3	6.26	49.0	9.84	....	....	2.36	2.0	3.21	150	1.86
6	16.6	5.00	31.2	6.52	....	....	1.93	.5	.80	249	3.53
17	23.4	7.21	36.7	5.69	....	....	1.89	2.9	5.48	293	1.69
3	26.6	6.88	39.7	6.38	....	....	1.95	2.8	5.10	130	1.60
21	22.3	6.79	33.6	7.05	....	....	1.85	1.5	2.58	453	8.58
7	26.0	7.70	39.2	5.40	....	....	.73	2.9	4.90	302	3.64
14	10.5	3.16	14.0	3.85	1.3	1.96	1.61	1.4	2.87	309	5.03
4	16.0	4.05	26.6	6.12	2.6	1.91	2.63	1.2	2.39	147	2.98
10	14.6	4.01	5.8	1.19	5.0	5.87	1.41	1.9	3.10	363	5.21
9	11.1	3.25	22.0	3.26	.4	.35	.75	1.5	2.55	234	2.62
8	15.5	3.58	30.3	5.58	....	....	1.42	.8	1.36	237	3.26
20	22.2	6.77	34.6	9.02	....	....	2.31	2.0	3.62	388	5.82
19	17.3	4.68	30.0	9.29	....	....	1.43	1.5	3.13	268	4.27
22	13.9	3.80	30.8	5.60	....	....	1.59	4.8	8.92	347	4.51
15	13.5	3.98	28.9	6.25	....	....	1.56	3.3	5.88	324	5.02
Tractor farms	12.9	3.54	10.5	2.44	3.3	3.53	1.43	1.6	2.86	274	3.66
Horse farms	18.2	5.00	33.3	6.47	.1†	.07	1.78	1.9	3.34	235	3.14
All farms	15.9	4.36	23.4	4.71	1.5	1.58	1.63	1.8	3.13	252	3.37

TABLE 32.—Wheat: Variations in Cost of Production, 1921-1924—Continued

Cost per acre									Yield per acre	Cost per bushel
Seed		Twine, fuel, threshing	Overhead charge	Taxes on land	Interest on land	Total cost	Straw credit*	Net cost		
Amount	Cost									
Bu.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Bu.*	*Dol.*
2.1	2.58	2.31	1.42	.86	4.48	35.05	7.14	27.91	28.6	.98
2.1	2.06	1.66	.62	1.15	4.80	25.10	3.95	21.15	19.6	1.08
1.9	1.88	1.70	1.54	1.02	5.29	33.31	5.00	28.31	22.3	1.27
1.9	2.75	2.00	1.16	1.75	6.60	36.58	5.80	30.78	23.5	1.31
2.2	2.75	1.41	1.00	1.06	4.58	24.27	3.57	20.70	15.8	1.31
1.9	2.89	1.51	1.32	1.07	4.80	28.45	4.25	24.20	17.9	1.35
2.0	2.78	1.43	.92	1.35	4.20	26.96	4.20	22.76	16.9	1.35
1.5	2.54	1.95	1.36	1.04	6.29	36.71	5.42	31.29	22.6	1.38
1.7	2.70	1.57	.74	.64	5.10	28.53	4.21	24.32	17.7	1.38
2.0	1.96	1.82	.87	.91	5.10	32.62	4.58	28.04	19.6	1.43
1.8	3.20	1.91	1.02	.98	5.10	34.12	5.19	28.93	19.9	1.45
1.9	4.70	2.48	.60	1.21	6.00	41.84	6.04	35.80	24.0	1.49
2.1	2.54	1.69	1.21	.72	5.66	34.19	4.76	29.43	19.4	1.52
1.9	4.37	1.56	1.28	.95	6.60	33.24	4.69	28.55	18.7	1.53
2.1	3.52	1.55	1.58	1.02	4.80	32.55	4.02	28.53	18.0	1.58
1.9	3.11	1.57	1.10	1.22	6.78	34.57	4.98	29.59	18.4	1.61
1.9	2.01	1.06	.81	2.18	5.13	23.97	2.79	21.18	12.1	1.75
2.0	3.93	1.16	1.03	.82	5.60	27.74	3.14	24.60	13.6	1.81
1.8	5.40	2.22	.95	.85	4.80	41.76	4.58	37.18	19.2	1.94
2.1	5.16	1.54	.78	.54	4.20	35.02	3.44	31.58	14.2	2.22
2.0	4.96	1.50	1.51	.84	5.70	38.93	3.68	35.25	15.2	2.32
1.7	4.07	1.25	1.80	.87	4.84	35.52	3.19	32.33	13.9	2.33
2.0	3.22	1.61	1.09	1.21	5.43	30.02	4.32	25.70	18.3	1.40
1.9	3.04	1.57	1.15	1.09	5.28	31.93	4.24	27.69	17.8	1.56
1.9	3.12	1.58	1.12	1.14	5.35	31.09	4.27	26.82	18.0	1.49

*Straw valued at $5.00 per ton.
†Small amounts of tractor work hired on Farms 5 and 9.

TABLE 33.—Wheat: Labor, per Acre Once Over and Total, by Operations, Averages of All Farms Owning and All Not Owning Tractors, 1921-1924

Operation	Farms owning tractors							Farms not owning tractors						
	Times over	Labor per acre						Times over	Labor per acre					
		Once over			Total				Once over			Total		
		Man	Horse	Tractor	Man	Horse	Tractor		Man	Horse	Tractor	Man	Horse	Tractor
		Hr.	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*		*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*	*Hr.*
Plowing with tractor	.65	2.20	....	2.20	1.43	....	1.43	.03	1.62	....	1.62	.05	....	.05
Plowing with horses	.09	5.16	11.74	....	.48	1.09	....	.80	5.54	14.05	....	4.40	11.17	....
Disking with tractor	1.03	.50	....	.50	.51	....	.51	....	....	....	....	....	....	....
Disking with horses	.03	1.06	2.87	....	.04	.10	....	.59	1.04	3.35	....	.62	1.99	....
Spring-toothing with tractor	.26	.62	....	.62	.16	....	.16	....	....	....	....	....	....	....
Spring-toothing with horses	.38	1.03	2.72	....	.39	1.03	....	1.76	1.01	3.05	....	1.78	5.37	....
Rolling with horses	.36	.89	1.78	....	.32	.64	....	1.46	.87	1.79	....	1.27	2.61	....
Cultipacking with tractor	.18	.45	....	.45	.08	....	.08	....	....	....	....	....	....	....
Cultipacking with horses	.49	.83	2.21	....	.41	1.08	....	.38	.72	2.10	....	.27	.79	....
Spike-tooth harrowing	.17	.81	1.81	....	.14	.31	....	1.13	.82	2.16	....	.92	2.44	....
Two tools together	1.32	.58	....	.58	.77	.....	.77	......	....	....	....	....	....	....
Total seed-bed preparation	4.96	......	....	......	4.73	4.25	2.95	6.15	....	....	....	9.31	24.37	.05
Drilling	1.00	.98	1.96	....	.98	1.96	....	1.00	1.12	2.24	....	1.12	2.24	....
Cutting with tractor	.44	1.54	....	.77	.68	....	.34	.04	1.03	....	.52	.04	....	.02
Cutting with horses	.56	.85	2.37	....	.48	1.32	....	.96	1.03	3.08	....	.99	2.95	....
Shocking	1.00	1.48	....	....	1.48	.....	....	1.00	1.75	....	....	1.75	....	....
Reshocking	....	.11	....	....	.11	....	....	....	.23	....	....	.23	....	....
Shock-threshing	.72	3.39	2.81	....	2.45	2.03	....	.80	4.08	3.59	....	3.22	2.83	....
Hauling and stacking	.28	3.94	3.54	......	1.10	.98	....	.20	3.75	4.13	....	.75	.83	....
Stack-threshing	.28	3.15	....	....	.87	......	....	.20	3.96	.53	....	.79	.10	....
Grand total	....	....	....	......	12.88	10.54	3.29	....	....	....	....	18.20	33.32	.07*

*Hired tractor work.

TABLE 34.—Mixed Clover and Timothy Hay: Variations in Cost of Production, 1920-1924

Farm	Cost per acre																		Yield per acre	Cost per ton
	Man labor		Horse work		Use of tractor		Equipment charge	Manure charge		Seed			Overhead charge	Taxes on land	Interest on land	Total	Pasture and second cutting credit	Net cost		
	Amt.	Value	Amt.	Cost	Amt.	Cost		Amt.	Value	Clovers*	Timothy	Total cost†								
	Hr.	Dol.	Hr.	Dol.	Hr.	Dol.	Dol.	T.	Dol.	Lb.	Lb.	Dol.	Dol.	Dol	Dol.	Dol.	Dol.	Dol.	T.	Dol.
6	7.9	2.37	12.9	2.69	....	......	.79	....	.06	7.6	2.2	2.49	.75	.61	5.10	14.86	2.46	12.40	1.98	6.26
17	8.9	2.76	10.0	1.56	....	......	.93	2.4	4.58	7.0	1.7	2.24	.74	.89	5.10	18.80	4.31	14.49	1.85	7.83
11	15.9	3.40	16.7	3.03	....	......	1.48	.9	1.41	9.3	3.9	3.20	1.69	.87	4.50	19.58	2.08	17.50	2.16	8.10
10	10.1	2.77	4.1	.83	2.4	2.82	1.01	2.7	4.34	6.3	1.5	2.02	2.12	1.15	6.75	23.81	3.19	20.62	2.53	8.15
2	10.0	2.49	17.2	3.46	....	......	.83	.7	.84	7.3	3.1	2.49	1.54	1.10	6.00	18.75	2.03	16.72	2.04	8.20
3	11.9	3.07	11.4	1.90	....	......	1.10	.8	1.44	6.2	4.4	2.29	1.33	1.07	5.10	17.30	1.05	16.25	1.96	8.29
7	13.7	4.06	14.2	1.96	....	......	.52	1.2	1.93	5.0	5.3	2.03	1.84	.72	5.66	18.72	.85	17.87	2.14	8.35
1	8.1	2.23	8.4	1.77	1.2	1.20	.71	.9	1.56	6.4	2.2	2.14	1.52	1.58	6.60	19.31	.95	18.36	2.18	8.42
14	8.1	2.44	10.6	2.91	....	......	.96	1.2	2.35	11.3	4.7	3.87	1.44	.85	6.60	21.42	2.27	19.15	2.07	9.25
5	6.8	2.02	9.6	1.94	....	......	1.03	1.7	2.98	9.0	3.8	3.03	1.52	.91	4.80	18.23	.47	17.76	1.88	9.45
19	10.1	2.72	12.0	3.73	....	......	.86	.5	1.12	15.0	2.3	4.69	.97	.53	4.20	18.82	....	18.82	1.99	9.46
9	9.8	2.88	15.5	2.30	....	......	.53	.9	1.52	6.6	2.8	2.26	1.23	1.77	5.10	17.59	1.12	16.47	1.73	9.52
20	12.1	3.54	11.2	2.93	....	......	.75	1.4	2.57	6.7	3.3	2.28	1.26	.85	4.80	18.98	.36	18.62	1.88	9.90
21	9.9	3.02	13.0	2.72	....	......	.71	.8	1.35	11.6	1.2	3.59	1.50	1.22	6.00	20.11	....	20.11	1.93	10.42
16	8.2	2.40	7.3	1.84	.4	.37	.51	.8	1.21	4.4	3.6	1.68	.77	1.15	4.80	14.73	.41	14.32	1.37	10.45
12	6.8	2.01	9.0	3.39	.2	.19	.84	.9	1.40	7.9	2.3	2.62	.79	1.25	4.20	16.69	1.02	15.67	1.39	11.27
8	12.7	2.93	13.2	2.43	....	......	.62	1.2	2.02	8.0	2.7	2.66	.93	.77	5.70	18.06	....	18.06	1.50	12.04
18	7.2	2.15	7.5	1.60	....	......	.60	1.0	1.90	9.2	.9	2.78	.80	1.08	5.10	16.01	....	16.01	1.28	12.51
4	6.4	1.63	9.3	2.14	.1	.07	.84	.9	1.84	8.6	2.6	2.79	1.17	1.02	4.80	16.30	.36	15.94	1.24	12.85
22	7.2	1.96	14.3	2.60	....	......	1.67	1.0	1.87	7.6	3.9	2.64	1.88	.92	5.70	19.24	.51	18.73	1.43	13.10
13	7.8	2.23	7.5	1.45	....	......	.35	2.8	4.42	13.6	1.7	4.16	.97	1.05	4.50	19.13	1.32	17.81	1.31	13.59
15	11.1	3.27	16.0	3.45	....	......	.86	3.7	6.66	5.9	2.8	2.05	2.54	.87	4.84	24.54	....	24.54	1.55	15.83
23	6.1	1.84	8.4	1.11	....	......	1.68	2.2	3.50	8.0	3.0	2.72	.88	2.47	6.60	20.80	....	20.80	1.28	16.25
Av.	9.2	2.51	10.8	2.25	.3	.31	.80	1.2	2.16	7.9	2.8	2.64	1.27	1.08	5.40	18.42	1.07	17.35	1.76	9.86

*Includes small amounts of sweet clover or alfalfa on a few farms.
†Red clover and alsike at $18.00 per bushel, sweet clover and alfalfa at $15.00, and timothy seed at $4.50 per bushel.

TABLE 35.—Timothy Hay: Variations in Cost of Production, 1920-1924

Farm	Cost per acre																Yield per acre	Cost per ton
	Man labor		Horse work		Use of tractor		Equipment charge	Manure charge		Seed	Overhead charge	Taxes on land	Interest on land	Total	Pasture credit	Net cost		
	Amt.	Value	Amt.	Cost	Amt.	Cost		Amt.	Value									
No.	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Hr.*	*Dol.*	*Dol.*	*Tons*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Tons*	*Dol.*
5	6.2	1.87	9.4	1 90	......	......	1.03	.6	1.00	.20	1.46	.91	4.80	13.17	......	13.17	1.81	7.28
21	10.2	3.12	12.1	2.52	......	......	.66	......	3.44	.21	1.62	1.19	5.88	18.64	......	18.64	2.54	7.34
2	7.6	1.89	14.7	2.95	......	......	.71	2.8	4.54	.31	1.81	1.10	6.00	19.31	.22	19.09	2.40	7.95
14	6.9	2.07	7.3	2.00	......	......	.66	2.0	4.02	.27	1.49	.85	6.60	17.96	.65	17.31	2.14	8.09
9	8.1	2.39	12.2	1.81	......	......	.41	.8	1.32	.21	1.07	1.76	5.10	14.07	.24	13.83	1.50	9.22
4	6.1	1.54	8.7	2.00	......	......	.77	1.2	2.42	.17	1.34	1.02	4.80	14.06	.87	13.19	1.41	9.35
1	8.1	2.25	8.5	1.80	1.4	1.43	.74	1.5	2.66	.11	1.37	1.58	6.60	18.54	......	18.54	1.97	9.41
20	9.3	2.71	10.3	2.69	......	......	.69	4.0	7.33	.19	1.47	.85	4.80	20.73	......	20.73	2.19	9.46
18	8.4	2.51	9.2	1.97	......	......	.73	.4	.79	.11	.86	1.08	5.10	13.15	......	13.15	1.38	9.53
13	6.9	1.99	5.9	1.13	.3	.57	.36	.9	1.38	.12	.90	1.05	4.50	12.00	......	12.00	1.22	9.84
17	5.9	1.84	7.4	1.15	......	......	.70	.9	1.74	.16	.47	.89	5.10	12.05	.12	11.93	1.19	10.03
19	9.6	2.59	10.0	3.10	......	......	.69	.7	1.38	.24	.65	.53	4.20	13.38	......	13.38	1.33	10.06
7	16.4	4.88	13.2	1.81	......	......	.46	3.7	6.25	.49	1.89	.72	5.66	22.16	......	22.16	2.19	10.12
3	10.4	2.68	12.7	2.11	......	......	1.23	2.5	4.56	.27	1.11	1.07	5.10	18.13	.74	17.39	1.65	10.54
6	6 2	1.85	9.6	2.00	......	......	.60	2.5	4.41	.21	.53	.61	5.10	15.31	.40	14.91	1.41	10.57
10	12.3	3.36	3.0	.60	2.0	2.36	.78	4.4	7.15	.13	1.71	1.15	6.75	23.99	2.28	21.71	2.05	10.59
16	7.9	2.31	6.3	1.60	.6	.50	.47	1.0	1.61	.26	.71	1.15	4.80	13.41	.05	13.36	1.26	10.60
22	4.0	1.09	6.6	1.20	......	......	.78	1.1	2.04	.25	1.59	.92	5.70	13.57	......	13.57	1.22	11.12
8	11.2	2.61	11.3	2.09	......	......	.53	1.1	1.86	.26	.74	.77	5.70	14.56	......	14.56	1.19	12.23
15	10.2	3.01	14.9	3.23	......	......	.80	4.6	8.22	.17	2.43	.87	4.84	23.57	......	23.57	1.48	15.93
12	5.8	1.71	7.8	2.94	.4	.40	.77	3.5	5.32	.17	.55	1.25	4.20	17.31	......	17.31	.96	18.03
Av.	7.7	2.16	8.9	1.84	.2	.27	.58	1.4	2.47	.19	1.03	1.07	5.08	14.69	.17	14.52	1.45	10.01

TABLE 36.—A Day's Work for Various Farm Operations

Operation	Size of implement	Crew		Work accomplished per 10-hour day	
		Men	Horses or tractor	Average all farms	25 per cent accomplishing the most*
		No.	No.	Acres	Acres
Seed-bed preparation:					
Plowing for corn	Walking plow	1	2 horses	1.7	2.0
Do	14 in. sulky	1	3 horses	2.0	2.6
Do	2–14 in. gang	1	Tractor	4.6	6.2
Plowing for oats	Walking plow	1	2 horses	1.9	2.2
Do	14 in. sulky	1	3 horses	2.4	2.9
Do	2–14 in. gang	1	Tractor	5.0	6.6
Plowing for wheat	Walking plow	1	2 horses	1.6	1.9
Do	14 in. sulky	1	3 horses	1.8	2.5
Do	2–14 in. gang	1	Tractor	4.4	6.0
Disking	6 feet	1	2 horses	8.9	10.1
Do	6 feet	1	3 horses	10.1	12.0
Do	8 feet	1	Tractor	16.6	19.7
Spring-tooth harrowing	6 feet	1	2 horses	8.9	10.0
Do	6 feet	1	3 horses	10.3	11.9
Do	9 feet	1	Tractor	18.3	21.5
Rolling	7 feet	1	2 horses	11.5	13.3
Cultipacking	7 feet	1	2 horses	12.2	14.0
Do	8 feet	1	3 horses	14.6	16.7
Spike-tooth harrowing	2 sections	1	2 horses	12.7	15.0
Do	2 sections	1	3 horses	14.0	17.0
Corn:					
Drilling fertilizer	10–11 hoe drill	1	2 horses	11.3	13.2
Planting	2 row	1	2 horses	11.0	13.4
Cultivating	1 row	1	2 horses	6.4	7.6
Do	2 row	1	2 horses	9.3	12.0
Cutting and shocking	....	1	....	.9	1.2
Cutting	Binder	1	2 horses	5.5	7.0
Do	Binder	1	3 horses	6.2	7.8
Shocking after binder	....	1	....	2.4	3.4
Husking from shock	....	1	....	21.0 bu.	27.0 bu.
Cribbing	Wagon	1	2 horses	110.0 bu.	128.0 bu.
Hauling corn and filling silo	....	12	10 horses	60 tons	75 tons
Oats and wheat:					
Drilling	9-hoe drill	1	2 horses	8.3	9.8
Do	10-hoe drill	1	2 horses	9.2	10.8
Do	11-hoe drill	1	2 horses	10.2	11.9
Cutting	6 feet	1	3 horses	9.0	10.3
Do	7 feet	1	3 horses	10.2	12.2
Do	7 feet	2	Tractor	14.0	16.0
Shocking oats–40 bu. yield	....	1	....	6.3	8.0
Shocking wheat–18 bu. yield	....	1	....	6.1	7.7
Stacking grain	Wagons	4	4 horses	11.1	15.7
Threshing stacked oats	....	9	....	1295 bu.	1564 bu.
Threshing stacked wheat	....	9	....	516 bu.	692 bu.
Shock-threshing oats	Wagons	13	10–12 horses	1190 bu.	1508 bu.
Shock-threshing wheat	Wagons	12	10 horses	552 bu.	750 bu.
Hay:					
Sowing grass seed	Hand seeder	1	....	27.0	36.0
Cutting	5 ft. mower	1	2 horses	8.8	10.6
Do	6 ft. mower	1	2 horses	9.8	11.4

*Average of that one-fourth of the farmers who accomplished most per day at the operation in question and not necessarily at all operations.